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for the Operating Room

Susan D. Sheets,
CST, MSN, RN, CNOR

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F. A. Davis's Notes Book



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Printed in China by RR Donnelly

Last digit indicates print number: 10 9 8 7 6 5 4 3 2 1

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Library of Congress Cataloging-in-Publication Data

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Surgical Conscience: The Patient First

- The motto for the Association of Surgical Technologists (AST) is “Aeger primo,” or “The patient first.” Every patient deserves the best you can give him or her.
- The surgical team members must place the highest emphasis on patient safety, care, and compassion.
- Surgical conscience is that small voice in your head that tells you, “I have contaminated.” It is your ethical responsibility to practice strict aseptic technique to protect the patient from infection.
- The surgical technologist and the perioperative nurse are each responsible for creating and maintaining a sterile field. They each must monitor aseptic practice by all members of the surgical team or anyone entering the operating room.
- This is done by:
 - Working together
 - Helping each other
 - Being a team player and keeping the patient first
 - Dealing with issues after the case, not during!
- Maintain your professionalism by keeping your standards high.

Adhering to the rules of aseptic technique shows that you are putting the patient first and modeling the highest standard of practice.

Aseptic Technique

- *Asepsis* is a condition in which the body is considered sterile. *Sterility* is an absolute, meaning free of infectious microorganisms. The definition of asepsis is *without infection*.
- The team should meet the goal of asepsis for each surgical case. Aseptic technique is a means to achieve that goal.
- No one can eliminate all microorganisms in the surgical environment, but everyone can strive to minimize pathogenic microbes for the patient's betterment.
- Strict adherence to aseptic technique is the most important thing we can do to prevent the patient and staff from acquiring an infection.
- Give yourself time and practice to develop good aseptic technique.
- The more you work in your field, the more proficient you will become.

Everyone makes mistakes.

Most breaks in aseptic technique can be corrected if they are reported.

Do not be afraid to report a break in aseptic technique.

The Aseptic Technique Approach

- The aseptic technique approach
 - Involves thinking and then doing each surgical procedure from start to finish.
 - Requires performing tasks in a way that reduces the risk of infection in patients and staff.
 - Is based on the principle that microorganisms from the air, fluids, surfaces, and dust transmit disease to patients and personnel.
 - Results in reduction or elimination of microorganisms to prevent them from touching the sterile field.

Self-Monitoring

- Constant self-monitoring is required for aseptic technique.
- Be aware of your sterile field boundaries.
- Give yourself time to set up.
- Always set up the basic Mayo and back tables the same way. This decreases your set-up time and lessens the possibility of contamination.
- If you or anyone contaminates the area, speak up and fix it.
- Do not hesitate to correct someone's technique when the need arises. Keep your eye on new team members and other personnel that enter the room temporarily, such as a PCA or x-ray tech, as well as a new surgeon, surgical resident, RN, or CST.

🎯 Rule of Thumb: If in Doubt, Throw It Out!

- If you think you may have contaminated something, you **MUST** take action accordingly. Change gloves or gown or toss the item from the sterile field and obtain a new sterile one immediately.
- Do not hesitate to refuse an item from a circulator if it appears to have been tampered with, rendering it nonsterile.
- Remember your training and understand your scope of practice.

Maintaining a Sterile Field

As a scrub professional, you must stay within the Recommended Standard of Care from the AST and AORN standards.

Scrub Professionals Need to Work within the Sterile Field

- The center of the sterile field is the operative site. The field expands out to include everything around it that is sterile, such as the Mayo stand and back table.
- Professionals within the sterile field must be attired correctly according to the Recommended Standards of Care. Sterile personnel should wear their scrub attire, caps, masks, eye protection, and sterile gowns and gloves to prevent microbial transference to the sterile field, surgical site, and patient during the surgical procedure.
- Set up the sterile field as close to the time of surgery as possible; once set up, the sterile area should be monitored throughout.
- Movement needs to be kept to a minimum within the sterile field to cut down on contamination.
- Nonsterile personnel never lean over or reach over the sterile field to give anything to the sterile personnel. A nonsterile person does not pass between two sterile surfaces; rather, he/she must go around the sterile area.



To Establish a Sterile Field, Sterile Drapes Are Used

- Surgical drapes should minimize the passage of microorganisms by establishing an aseptic barrier between nonsterile and sterile areas.
- Sterile drapes are used on any item that will be included in the sterile field—the patient, equipment, and furniture—to prevent microorganism transfer from nonsterile to sterile areas.
- The sterile drapes need to be handled as little as possible. This decreases the chances of anything migrating to the sterile drapes, such as dust or lint from the air current created with more movement.
- Sterile drapes are held in a compact manner, slightly higher than the OR bed, and placed first on the surgical site, then to the periphery. This decreases contamination. Modified draping is needed on some procedures, such as on the extremities.
- While draping, the gloved hands need to be protected by cuffing the drape over the hands to decrease contamination.

⚠ Once positioned in place, the sterile drape should not be moved. Moving the sterile drape in any way compromises the sterility of the sterile field.

Gowning and Gloving Must Be Done in a Sterile Fashion

- You must perform a surgical hand antisepsis as recommended before donning gown and gloves.
- The front of a sterile gown is considered sterile from the chest or nipple line to the level of the sterile table or belly button. The gown sleeves are sterile from 2 inches above the elbow to the cuff and circumferentially. The back of the gown is considered nonsterile because it cannot be monitored.
- Your gown should cover you completely and prevent the exposure of the cuffs outside the gloves.
- Sleeve cuffs are considered contaminated if your scrubbed hands pass beyond the cuff. The cuff should rest at or below the wrist area.
- The sleeves should not be pulled up to expose the cuffs. The sleeves should be of adequate length to cover the back of the hand so the gown cuff will not be exposed when the gloves move.
- Double gloving is recommended to decrease the potential for contact with blood and body fluids (as determined by your facility's policies). Inspect gloves for integrity after donning. Gloves that are intact keep microorganisms at a minimum.
- Change contaminated gloves as quickly as possible. Check your facility's policy on how to do this.

Scrubbing

- The AORN recommends that surgery personnel do a hand scrub before donning their sterile gown and gloves.
- Use an antimicrobial scrub agent for surgical hand antisepsis or alcohol-based antiseptic surgical hand rubs approved by the Food and Drug Administration. New CDC guidelines support the use of alcohol-based hand rubs.
- A surgical hand scrub will reduce the transient and resident microorganisms and maintain a level under the baseline. You need to rub the skin, with or without a sponge or brush, to create friction and rinse with running water to flush the microorganisms away.
- Foams are used without water. The alcohol base of the foams reduces the transient and resident microorganisms.
- Soaps can be used with or without water, depending on their type.

Water and Waterless Scrubs

Example	Description	Advantage	Disadvantages
Waterless			
Alcare	Designed for hand antisepsis and moisturizing in the OR Leave-on surgical scrub	Broad-spectrum antimicrobial activity Effective immediately & up to 6 hrs	Highly flammable Never use on mucous membranes
Avagard D Triseptin Waterless Surgicept	Brushless hand antiseptic for surgical hand scrubbing Decreases bacterial growth up to 6 hrs	Easy to use and apply	
Water			
Hibiclens	Variety of uses: surgical hand scrub, hand wash in hospital setting, patient prep skin prep, & as a general skin cleanser	Effective against a broad range of microorganisms Can be used repeatedly throughout the day without causing problems	Hibiclens can cause hearing loss; never use with ear or face cases
BD E-Z Care™	Product line includes rinseless & brushless alcohol-based scrubs, foam solutions, & a variety of impregnated & dry brushes	Kills a broad spectrum of organisms including multi-drug resistant organisms (VRE & MRSA)	Highly flammable Do not use on mucous membranes
Hibistat®	Available in foam or liquid applications	Shortened surgical scrub time Increased compliance Proven effective	Highly flammable Do not use on mucous membranes

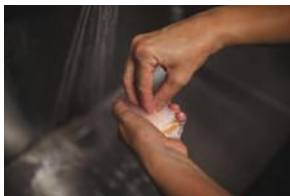
Soap and Water-Based Surgical Scrub

- The timed or counted scrub is usually used for the first scrub of the day unless your facility approves of another method, such as foaming.
- Many facilities use a waterless or brushless scrub for the remainder of the day.
- Hard bristle brushes are no longer used for scrubbing because they increase shedding of skin cells. “Brushes” for surgical scrubbing now have a soft brush side and a sponge side. Depending on your facility’s policies, you will use either a sponge or the soft brush for a 3- to 5-minute scrub.
- Know your institution’s policies and procedures on scrubbing.
- A traditional hand scrub procedure with soap should include the steps outlined in the next section; however, check your facility’s policies and procedure to determine if they require additional steps.

Steps in the Soap and Water Scrub

Even if you are not scrubbing, wear a surgical mask anytime you are in the presence of others who are scrubbing at the scrub sink.

1. Remove all jewelry (rings, watches, bracelets).
2. Don a surgical mask and eyewear.
3. Wash hands and forearms with soap and running water immediately before beginning surgical scrub.
4. The subungual areas of both hands need to be cleaned under running water using a disposable nail cleaner or pick.
5. Use a brush to clean fingernails.
6. Rinse hands and forearms under running water, keeping your hands above the elbow level.

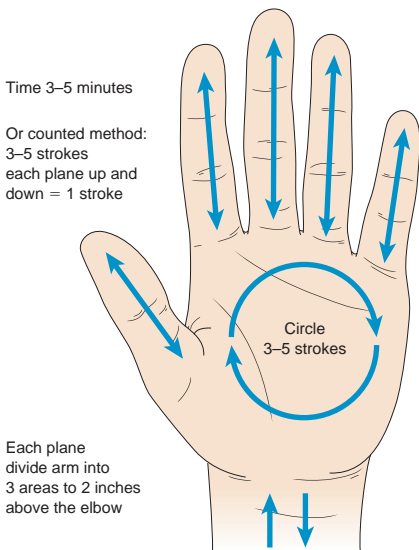


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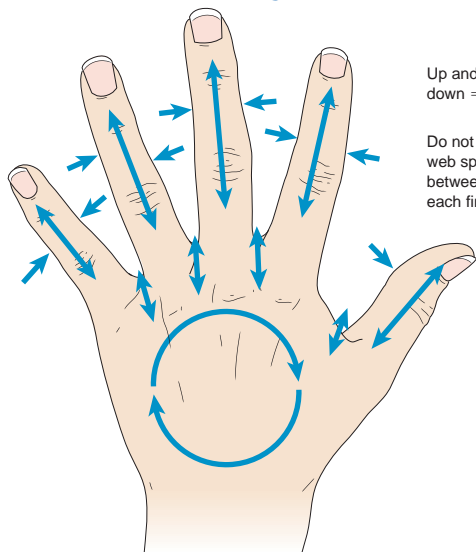
7. Start timing for a 3- or 5-minute scrub to allow adequate product contact with skin (follow the manufacturer's directions).



8. Apply your facility's approved antimicrobial scrub agent according to the manufacturer's directions with the sponge, scrubbing each side of each finger, between fingers, and the back and front of the hand for 2 minutes. (In brushless scrubbing, the technique is similar except that you don't use a brush. Instead, you scrub with your fingers and hands—but check the manufacturer's recommendations first.)



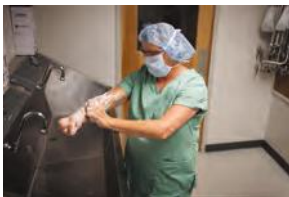
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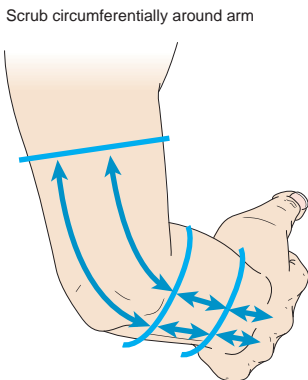
Up and
down = 1 stroke

Do not forget
web spaces
between
each finger

9. Proceed to scrub the arms, keeping the hands higher than the elbows at all times. This prevents bacteria-laden soap and water from contaminating the hands.



10. Wash each plane of the arm to 2 inches above the elbow for 1 minute.
11. Repeat process on other hand and arm, keeping hands above elbows at all times. If the hand touches anything except the brush at any time, the scrub must be lengthened by 1 minute for the area that has been contaminated, or repeat the entire process as per your institution's policy.
12. Toss sponges, if used, in appropriate containers. This decreases any cross-contamination of the surgical scrub sink area.
13. Rinse hands and arms by passing them through the water in one direction only as often as needed, from fingertips to elbow. Do not move arm back and forth through the water.
14. Hold hands higher than elbows and away from surgical attire to prevent contamination and allow water to run from fingertips to elbows—the clean to the less clean area—down the arm.
15. Do not splash water on your surgical attire during your scrubbing. The sterile gown needs to be donned over dry attire to decrease potential contamination of gown by strike-through moisture.



16. Walk directly into the OR, and dry hands and arms with a sterile towel before donning a sterile surgical gown and gloves.

Using Sterile Towel



Note: If the hands and arms are grossly soiled, the scrub time should be lengthened. Avoid vigorous scrubbing that abrades the skin, however.

Alcohol-Based Surgical Scrub (Foaming)

- Foam is an alcohol-based soap that dries quickly. No towel is needed for drying. Many of these products have persistence, and their activity is cumulative.
- *Institutions vary in their policies for alcohol-based scrubbing or foaming.* Some recommend only foaming while others allow soap and/or foaming. Many facilities recommend scrubbing with soap for the first scrub of the day and then foaming after that. Use procedures for scrubbing vs. foaming based on your facility's policy.
- A hand scrub procedure using an alcohol-based surgical hand rub product should include, but may not be limited to, the steps in the following list. Check your surgical policies and procedure.

Steps in the Alcohol-Based Scrub

1. Remove all jewelry (rings, watches, and bracelets).
2. Don a surgical mask and eyewear. If others are at the scrub sink scrubbing, wear a surgical mask.

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3. Prewash hands and forearms with plain soap and water or antimicrobial soap.
4. Clean subungual areas of both hands under running water using a disposable nail cleaner or pick.
5. Rinse hands and forearms under running water.
6. Thoroughly dry hands and forearms with a disposable paper towel.
7. Dispense the manufacturer-recommended amount of the surgical hand rub product into your hand. This is usually about a quarter's size. Applying too much may keep your hands and forearms from drying adequately (too much is used in the photo on the **right**).



8. Rub product into both hands and up the forearms according to manufacturer's instructions to establish your foam scrub.



9. Repeat product application as directed.
10. Keep your hands above the waistline and allow them to air dry.

⚠ Do not use a towel, and do not wave your hands around to dry them. This can cause contamination and the product will not work as well.

11. *You can now don your gown and sterile gloves.*

Gowning

- Gowning is done once your hand scrub or foaming has been completed and your hands and arms are as clean as possible. Only then can you touch the gown and don it in a sterile manner.
- Do not touch anything but the folded gown when you are gowning. It is important to give yourself enough room to gown to avoid touching anyone or anything.
- Sterile gowning may vary from institution to institution. Please follow your facility's policies and procedures. Recall the standard of care according to the AST and AORN Recommendations and Practices for gowning and gloving. The following is one way to sterily gown yourself.

Opening a Sterile Gown Package

Open Sterile Wrap Away from You First



Donot Touch Sterile Gown after Open**Opening Sterile Gloves**



Steps in Gowning

1. When gowning yourself, grasp gown firmly and bring it away from the table.
2. Gown will be folded so that the outside faces away.
3. Hold the gown at the shoulders, allowing it to unfold gently.

⚡ Do not shake the gown; shaking will increase contamination.



4. Place your hands inside the armholes and guide each arm through the sleeves by raising and spreading the arms out. Make sure you watch each arm as you gown so you will not touch something or someone. If you do touch a nonsterile item, you will need to start the process over.
5. Do one arm at a time, never taking your eyes off your extended arm.



6. Fold your first arm into the sterile area between your nipple line and umbilicus.
7. Complete your second arm using the same technique.

⊘ Do not allow your hands to slide outside the gown cuff. This is considered a nonsterile area.

8. The circulator will assist by pulling the gown up over your shoulders and tying it.

⊘ Do not turn yourself by using something on the back table to hold the cardboard tab at the end of your tie and twirl around. This is not good practice. You are turning your back to the back table, and your back is not considered sterile.



Closed Gloving


Once you are in the sterile gown and your hand is positioned behind the cuff, you will be able to grasp the sterile glove, place it on your gown, and slide your hand into the glove sterilely. This is called closed gloving. (Open gloving is covered in Tab 7.) The following is one technique.



Steps in Closed Gloving

1. Don the first glove by grasping it through your gown sleeve.
2. Lay the glove palm down above the cuff of the gown. The fingers of the glove should face toward you.



 Do not allow your fingers to slide into the cuff or beyond it. The cuff of the gown's sleeve is considered nonsterile once your hand has gone through it.

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3. Working through the gown sleeve, grasp the glove cuff and bring it over the open cuff of the sleeve.



4. Unroll the glove cuff so that it covers the sleeve cuff.
5. Push your hand through with your fingers fanned out to glove hand.
6. Proceed with opposite hand, using the same technique.



Sterile Gowning with a Second Person Who Is Not Sterile





Disinfection

- As preparation for use on a patient, items are decontaminated (i.e., cleaned) and disinfected or sterilized.
- Disinfection is used only on inanimate objects and kills all microorganisms but spores. Sterilization, in contrast, kills all microorganisms, including spores.

Spaulding Method

- The Spaulding method is used in hospital settings to determine whether an item needs to be sterilized, disinfected, or just cleaned.
- The system assigns a risk category specific to the body region the item will be used in or on. Level of risk determines how items are processed.

Classification of Patient Care Items

Class	Description	Sterilization Level	Examples
Critical	Contacts sterile tissue; organs	Must be sterilized	Needles and instruments
Semicritical	Contacts nonintact skin or mucous membranes	High-level disinfection	Anesthesia equipment and gastrointestinal endoscopes
Noncritical	Contacts intact skin	Intermediate or low-level disinfection	Blood pressure cuffs and furniture

Disinfecting with Chemicals

Level	What It Kills
Low	Most vegetative bacteria, fungi, and the least resistant viruses, including HIV
Intermediate	Most bacteria, viruses, and fungi
High	All bacteria, viruses, and fungi

Sterilization

- Sterilization is the step-by-step process for making items free of microorganisms, including spores. Sterility has no levels of gradation: an item is either sterile or nonsterile.
- Central Service (or Central Processing; the terms are used interchangeably) decontaminates, disinfects, and cleans all instruments used in the OR. This area also keeps the sterile supplies. If you need something in surgery, this is where to find it.

Decontamination

Decontamination (removing all gross debris and bioburden) is the first step in the sterilization process. It is done on all instruments that have been incorporated during the surgical procedure.

1. Bioburden or gross debris is removed with a wet (sterile water, preferably) sterile sponge during surgery. *Remember that stainless steel instrumentation will pit if cleansed with saline.*
2. All instruments are opened. They must be covered or placed in a case cart to be transported to the decontamination area.
3. The instruments are run through a washer-sterilizer cycle for cleaning.
4. The ultrasonic washer can also be used to provide initial decontamination of instruments. The washer uses high-frequency sound waves to implode (remove) gross debris from instruments prior to being placed in a washer-decontaminator.
5. The instruments may also be cleaned manually when the need arises.
6. The person doing the manual cleaning is required to wear personal protective equipment (PPE). Meticulous care of the rinsing and drying process is required for each instrument.

After Decontamination

Central Processing personnel do most of the sterilization work. The CST or RN in surgery, however, often needs to clean and prepare instruments for immediate-use sterilizing or to clean scopes. You need to be aware of how this process works. The steps in preparing instruments for sterilization are as follows:

1. After instruments have gone through decontamination and can be touched, they are put into sets and wrapped by Central Processing personnel.



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 7.)

2. The workers arranging the set of instruments place an indicator on the tray before sterilization so that when the tray is opened, the scrub tech or nurse can see whether indicator has changed color; this shows that the instruments have been through the sterilization process and can be used.
3. Workers double wrap instrument trays and place indicator tape on the outside that changes color to show it has been through the sterilization process.



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 5.)

Types of Sterilization

- Sterilization can be done in a variety of ways.
- Steam is the most common and efficient method. Prevacuum steam sterilizers use a vacuum to pull air from the chamber and replace it with steam.
- Gas sterilization with ethylene oxide (EO) is used when the items to be sterilized are too sensitive to withstand the pressure of steam, heat, or moisture.
- Glutaraldehyde (Cidex®) is a liquid agent used for sterilization and high level disinfection of items that can be immersed in liquid, such as rigid and flexible endoscopes. The liquid is very toxic and must be used in a well-ventilated area. It has a shelf life that starts when it is mixed. The amount of time required to render an item sterile is 10 hrs 20 min for high level disinfection. You must rinse the item thoroughly before and after soaking. The first soaking rids any bioburden from the item and the second clears all glutaraldehyde from the instrument.

Comparison of Sterilization Methods

Type	Notes	Pressure	Temp.	Time
Steam	Most common Gravity air displacement sterilizers For wrapped items	15–17 psi	250°F (121°C)	15–30 min
Prevacuum (high vacuum)	For wrapped instruments, basins, linens, & as a flash sterilizer in OR for unwrapped instruments	27 psi	270°F (132°C)	≥4 min
Immediate-use sterilizing	Mainly used in surgical area Used in emergency situations (e.g., dropped instruments in OR) Not used for routine sterilization or sterilization of implants	27 psi	270°F (132°C)	3 min for unwrapped, nonporous, stainless steel items without a lumen 4 min in prevacuum or 10 min in gravity displacement cycle for porous items or lumen instruments
Ethylene oxide	Items are required to be totally dry Used for delicate items like micro instruments A dry type of heat		85°–100°F (29°–38°C) for cold cycle 130°–145°F (54°–63°C) for warm cycle	Humidity is required 25%–80% is recommended Time depends on density & material to be sterilized Aeration is required & can take up to 12 hrs for some items

Sterilization Care

- According to the manufacturer's recommendations, each sterilizer chamber needs to be washed daily.
- The discharge line needs to be flushed weekly and the filter screen cleaned daily.

Immediate-Use Sterilization Technique

- Immediate-use sterilization (formerly known as flash sterilization) is used mainly in the OR, and takes place either in the hallway between the OR rooms or in a room attached to an OR.
- Immediate-use sterilization is not a shortcut and should not be used as such; it is used only in true emergency situations (e.g., dropped instruments during a case). The standard of care is to use immediate-use sterilization sparingly. This type of sterilization is referred to as a just-in-time process.

The immediate-use steps are as follows:

1. Never wrap items.
2. Put items in a covered metal tray, if possible.
3. *Never* use the immediate-use sterilization for implant items (if dropped, open a second one).
4. Go by your manufacturer's guidelines and your facility's policies.
5. Use sterilized monitoring for each load.
6. Place item in the middle of the sterilizer.
7. Close door tight.
8. Run the item.
9. When item is done, a buzzer will sound to alert you.
 - a. Removing the item can be done in a number of ways:
 - Use transfer handles or towels that are sterile to deliver the item.
 - Pick up the tray with a sterile towel and move it to the CST in the room, keeping it sterile during the move.
 - b. It is recommended practice for the scrub professional to stay within the sterile field or room and not to retrieve the item from immediate-use sterilizer personally.
 - c. The sterile scrub then removes sterile item from tray and places it where needed.

IMMEDIATE-USE STERILIZATION CAUTIONS

- Never immediate-use sterilize anything wrapped.
- Note that sterilized instruments will be hot and wet.

Remember: Use a sterile towel to grab the hot instrument.

- Sterilized instruments must be ascertained by the sterile Surgical Technologist in the Scrub Role if the sterilizer is located in a substerile room close to the surgical suite. The circulator also may obtain the sterile item with a special open tray that allows the scrub to sterily reach into and grab the instrument.
- Immediate-use sterilizers should be in proximity to the OR so the sterilized items can be transferred with less possibility of contamination.
- If possible, duplicate the needed instruments, order more instruments to have an adequate inventory, or have the surgeon give the department the instruments the day before so they can be run through the autoclave for the procedure on the following day.

Routine use of immediate-use sterilizing is no longer recommended. The less one immediate-use sterilizes, the lower the chance for infection. No surgical department should immediate-use sterilize because they do not have enough instruments or if the surgeon has too few of his or her own instruments.

If your surgical department repetitively and routinely uses immediate-use sterilizers and reuses instruments, the Joint Commission could look at your facility in more detail. The Joint Commission wants the instruments well cleaned before they are put in the immediate-use sterilizer and they expect detailed documentation on the process to show it is being done correctly and sparingly.

Monitoring for Sterilization Practices

- Monitoring the sterilization process is very crucial to ensure the patient is not exposed to unsterilized items.
- The personnel opening cases sterily are required to check that the sterilizer tape has changed on the outside of the package. They are to check if the indicator inside the package has changed colors, indicating that it has indeed been through the sterilization process.

Sterilization Monitoring

Biological

- Very dependable method of finding parameters for sterilization.
- Uses commercially prepared spore vials or strips to make certain sterilization is completed.
 - *Bacillus stearothermophilus* used for steam sterilization; run daily preferably, weekly at a minimum.
 - *Bacillus subtilis* used in ethylene oxide (EO) gas sterilizers and for dry heat; run with each load.
 - Spore strips impregnated with either microbe are used in the Sterrad daily.

3M Attest™ Rapid Readout Steam Pack 1296/1296F

Record Keeping Sheet

Date _____	Load # _____
Dept. _____	Temp. _____
Sterilizer # _____	Test Time _____
	Initials _____

BAR TURNS DARK WHEN PROCESSED



Results		Test	Control	Visual
Biological Indicator	growth	+	+	+
	no growth	-	-	-



Chemical

- Treated strip or tape changes colors when the item is exposed to the parameters of the sterilant, temperature, and humidity.



Mechanical

- Used with all sterilizers.
- Records temperature, pressure, and length of time.
- Has printouts with all needed information of the sterilizing cycles; these are kept to prove items went through the process.
- If any measures are off, items are pulled and redone.

The previous methods guarantee only that the items have gone through the process. It does not guarantee that the items are sterile.



Preparing Case Carts

- Stainless steel case carts are used to wheel sterile items into the surgical suite and to remove them at the end of the case. Inside the cart are trays or shelves to carry sterile items to the OR from Central Service. The door protects the sterile items from contamination. When the case is done, all soiled instruments and items are replaced inside the cart with the door closed and transferred to Central Service to be decontaminated.
- Keeping the door closed helps keep microorganisms contained within the case cart so they will not contaminate anything.
- In many larger hospitals, Central Service personnel pull the case carts for the next day's procedures. This means they use the preference card from each surgeon to gather the needed sterile supplies and instruments for the surgeon's procedure or case.
- In smaller hospitals, the surgical department personnel, usually the certified surgical technologist (CST) and/or RN, pull instruments for the next day's cases.
- Preparing case carts the day before streamlines the surgical caseload for the following day's procedures because everything is ready to go for each scheduled case.



Turning over a Case

Multiple surgeries are performed each day in a single room in succession. Turnover is the time from the end of one surgical case to the start of the next surgical case. The time between one patient finishing with surgery and the next patient starting the process is considered turnover time.

The surgeon wants the time between cases to be efficient and quick. Smaller cases take the least amount of time, while larger cases take longer

to tear down and make ready for the next case. Surgeons want to start the next case as soon as the first one is done. They are on a tight schedule and have office hours to attend to, so they are usually pushing to start the next case. Just keep in mind the patient's needs come first and do your job thoroughly and timely.

Steps in Turning over a Case

1. The first case is completely torn down.
2. Disposable items are tossed.
3. Dirty instruments are put into case cart.
4. All the OR furniture is cleaned and readied for next surgery.
5. OR bed is taken apart, cleaned, and redressed for next surgery.
6. Floor is mopped. (Larger facilities have housekeeping to help with this process, but many smaller ones do not—you are the one cleaning and setting up.)
7. After the room has been thoroughly cleaned, the case cart of sterile supplies, instruments, and equipment for the next case is brought in.
8. Case is sterilely opened and set up.

Remember: Depending on the cases, turnover could take 5 minutes or 15 minutes, but you need to be as quick and efficient as possible. Having the case cart ready to roll for the next case streamlines the process. Keeping turnover time to a minimum also decreases the anxiety of the waiting patient, and is an example of keeping the patient's needs first.

Anatomy

Understanding and knowing anatomy is extremely important for a surgical team member. Your ability to associate the correct surgical anatomy with the procedure is crucial if you are to understand the preoperative, intraoperative, and post-operative phases of surgery. In addition, by recognizing anatomical structures, you will be able to anticipate the instruments the surgeon requires.

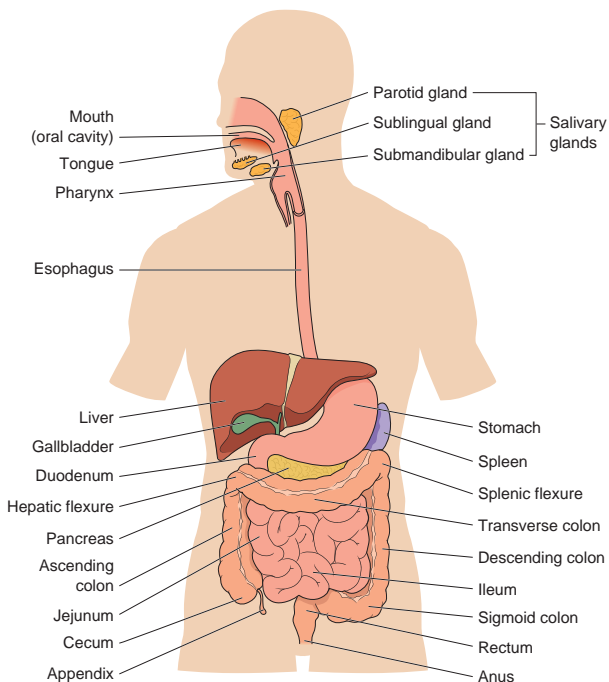
Surgeons love to quiz students and new employees on anatomy. If you know your anatomy and answer the questions correctly, the surgeons will recognize you as competent and feel more comfortable working with you.

Note: Depending on where you work, the vast majority of surgery procedures can be done open or laparoscopic, with laparoscopic being the most commonly used method.

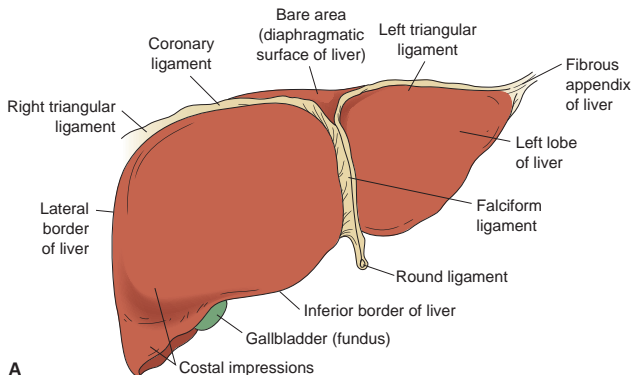
- The scrub personnel are required to know which side the surgeon will stand on and which side the scrub will stand on.
 - In an open case, the surgeon will stand on the incisional side with the scrub on the opposite side.
 - In a laparoscopic case, the surgeon will stand on the opposite side of the organ to work on (so the surgeon can look across the abdomen with the scope). The scrub will stand opposite the surgeon or may stand next to him/her, depending on the surgeon's preference.

Abdomen

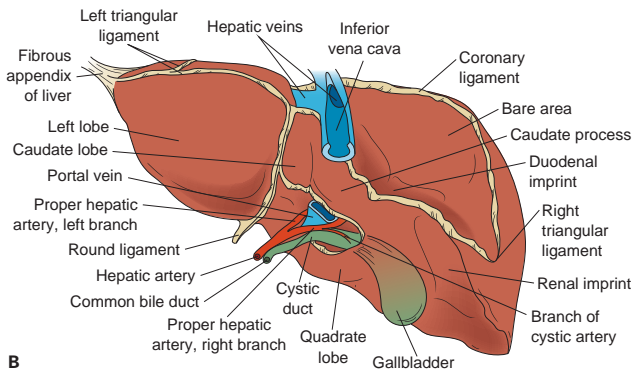
For surgery on the abdomen, you must know which organs are on the left and which are on the right so you can determine which side you will need to stand on. For example, during an open liver surgery the surgeon will stand on the right, scrub on the left; for a laparoscopic liver case, the surgeon will stand on the left and scrub on the right.

Digestive System—Anterior View

Liver and Gallbladder



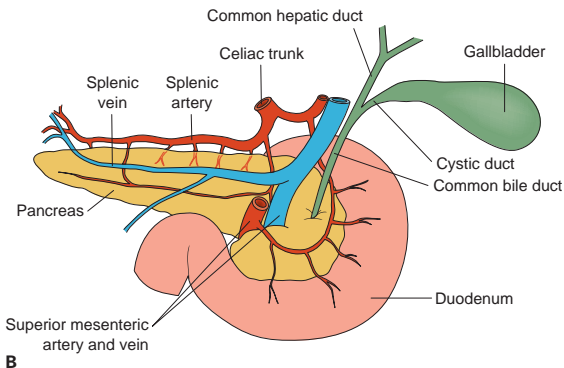
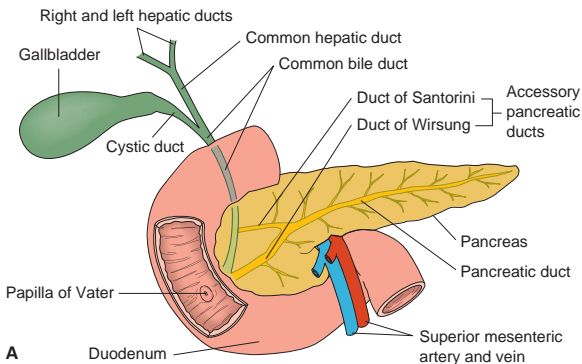
A



B

A. Anterior view, B. Posterior view

Duodenum, Gallbladder, and Pancreas



A. Anterior view, B. Posterior view

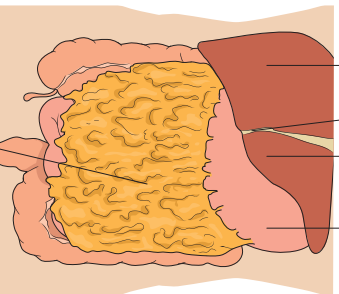
Small Intestine and Greater Omentum

Falciform
ligament

Right lobe
of liver

Left lobe
of liver

Stomach

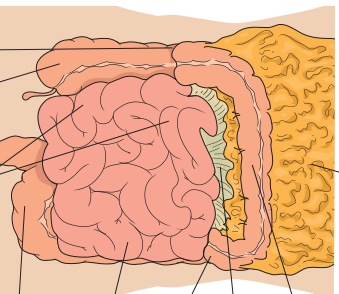


39

Greater omentum
overlying transverse
colon and small intestine
(jejunum and ileum)

A

Greater omentum
(turned up)



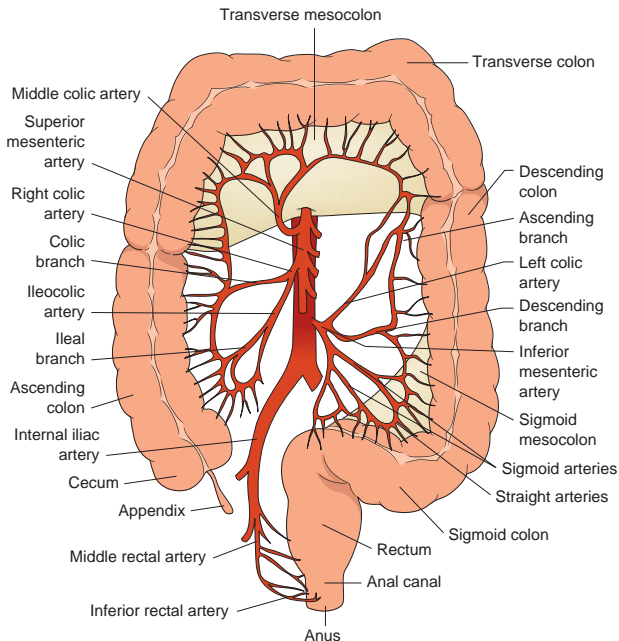
Cecum
Small intestine
(jejunum and ileum)
Right colic
(hepatic) flexure

B

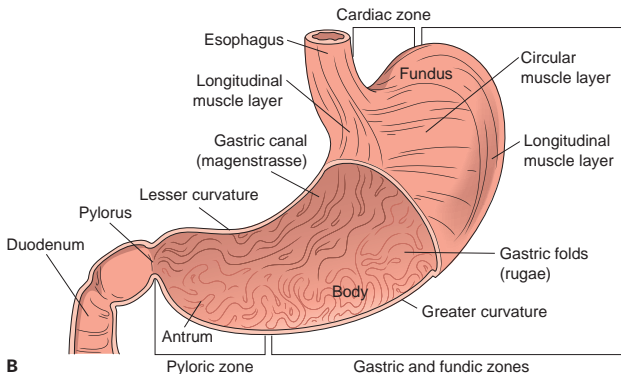
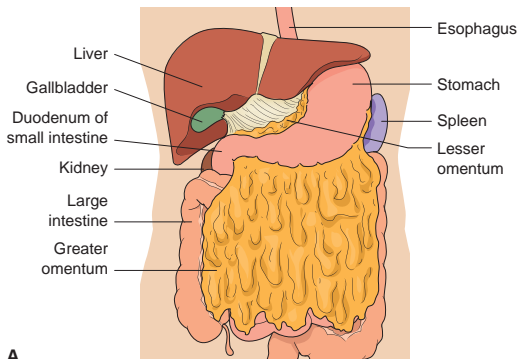
Transverse colon
(turned up)
Transverse
mesocolon
Left colic
(splenic) flexure
Small intestine
covering
descending colon
Sigmoid
colon

A. Anterior view, B. Anterior view with omentum turned up

Large Intestine and Rectum with Arterial Blood Supply—Anterior View



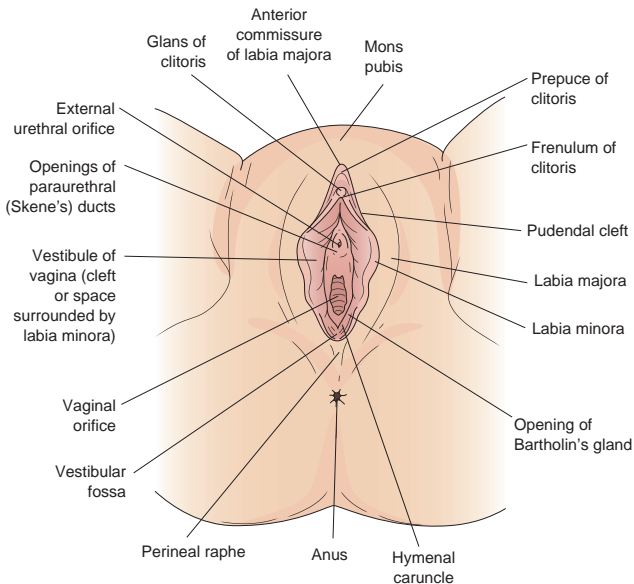
Stomach



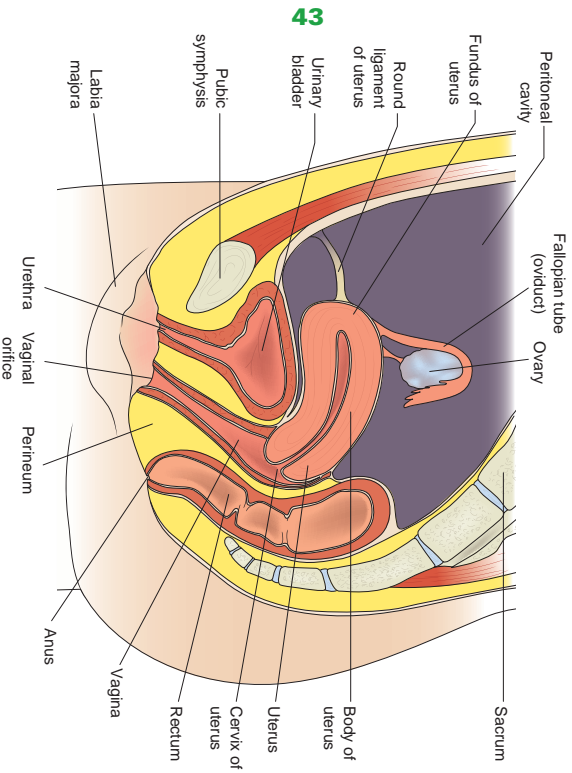
A. Anterior view, B. Anterior view—Interior

OB/GYN

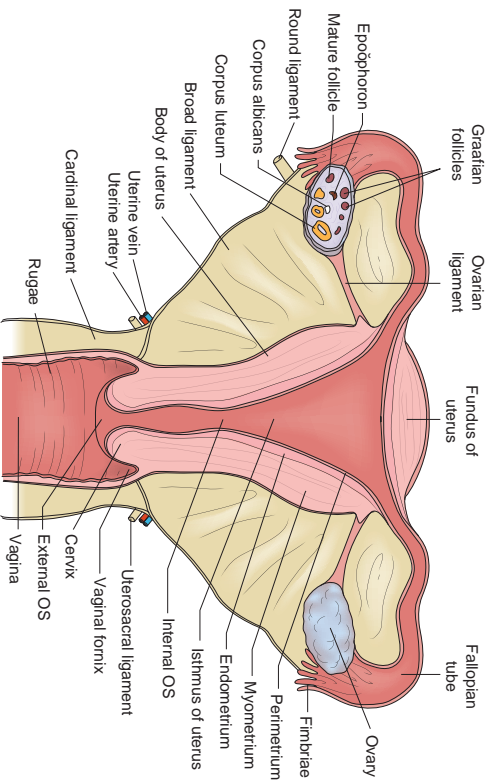
OB/GYN includes all female anatomy structures.

Female External Genitalia

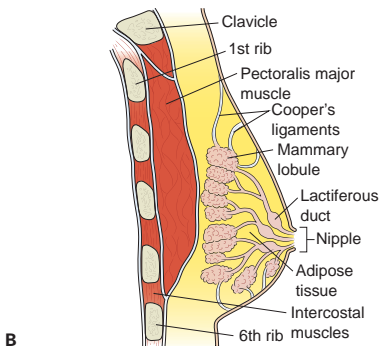
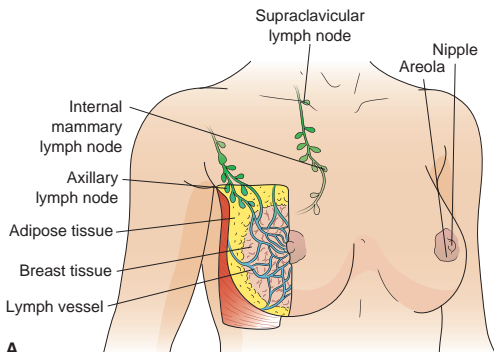
Female Reproductive System—Midsagittal Section



Uterus, Vagina, and Ovaries—Anterior View with Developing Follicles on Right Side



Female Breast

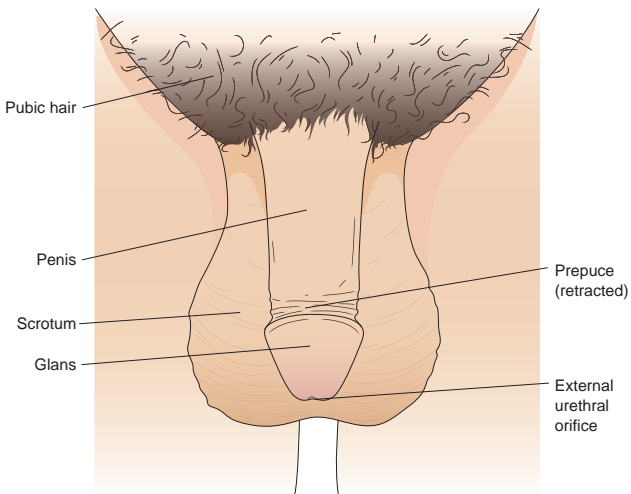


A. Anterior view, B. Sagittal section

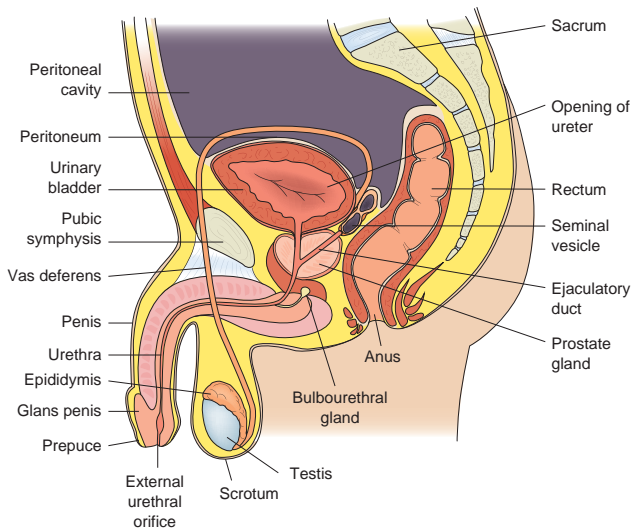
Genitourinary

Genitourinary includes all male anatomy, plus the bladder, kidneys, ureters, and urethra.

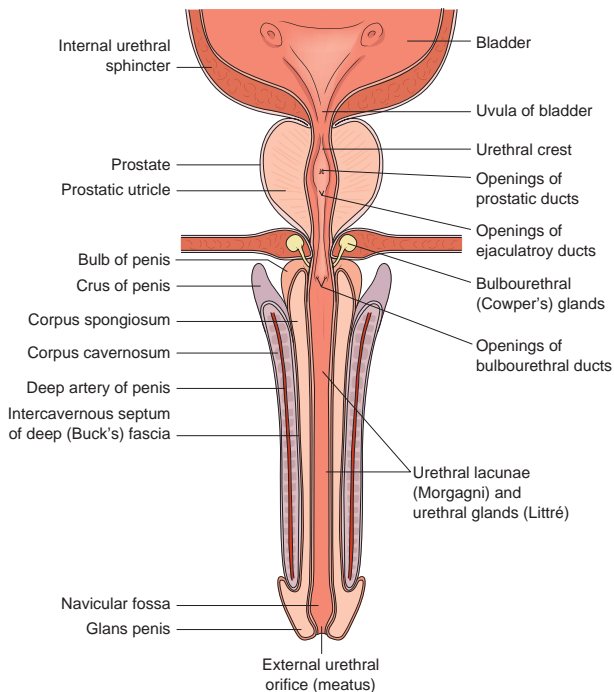
Male External Genitalia



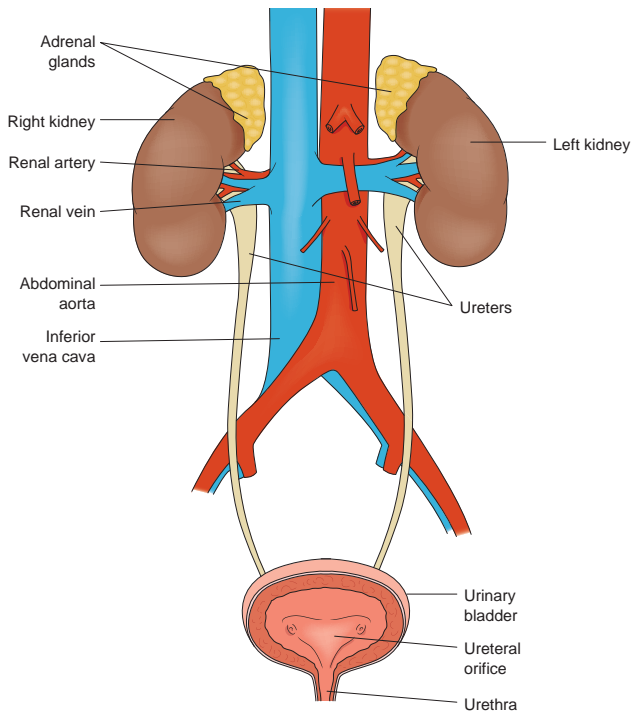
Male Reproductive System—Midsagittal Section



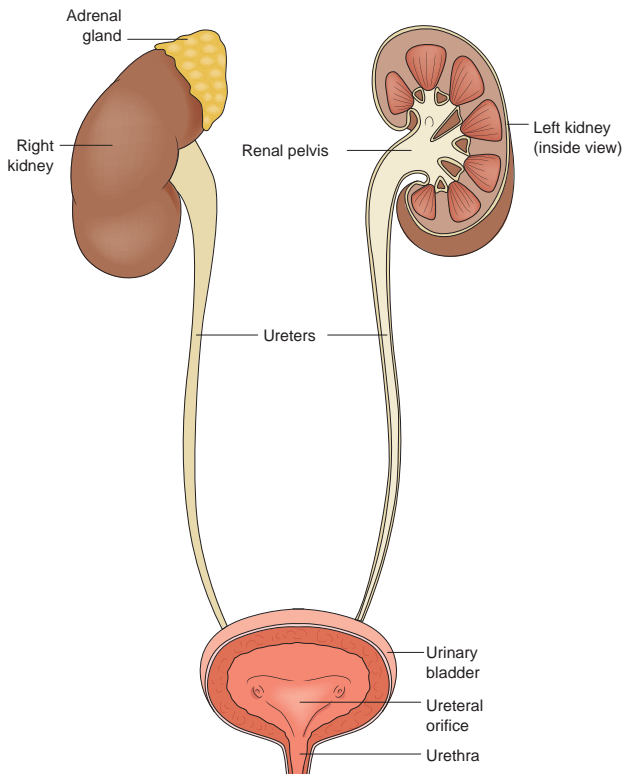
Penis and Prostate—Anterior Longitudinal Section



Urinary System—Anterior View



Kidneys and Ureters—Anterior View



Neuro

The brain and spine

51

Cranial Nerves and Their Functions

Name	Functions	Distribution
I: Olfactory	Smell	Nasal mucous membrane
II: Optic	Vision	Retina
III: Oculomotor	Eye movements	Most ocular muscles
IV: Trochlear	Voluntary eye movements	Superior oblique muscle of eye
V: Trigeminal	Sensations in head and face; movement of mandible	Skin of face; tongue; teeth; muscles of mastication
Ophthalmic branch	Sensations in front of head and face, eye sockets, and upper nose	
Maxillary branch	Sensations in nose, mouth, upper jaw, cheek, and upper lip	
Mandibular branch	Sensations in tongue, lower teeth, and chin	
VI: Abducens	Eye movements	Lateral rectus muscle of eye
VII: Facial	Taste; facial expressions	Muscles of expression

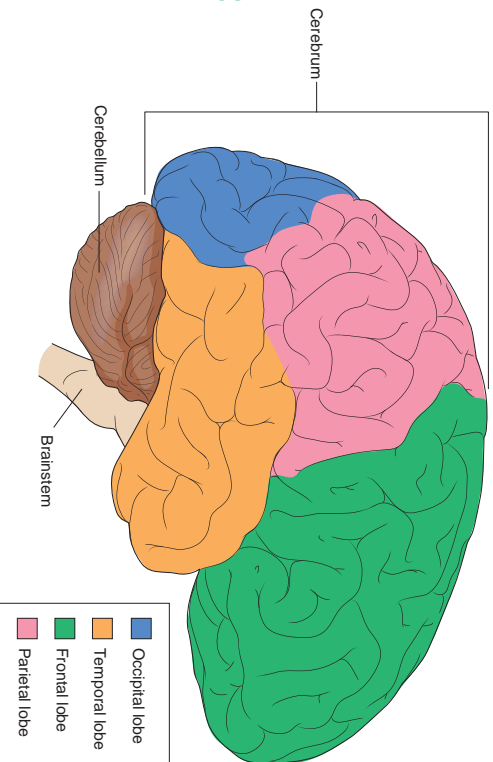
Continued

Cranial Nerves and Their Functions—cont'd

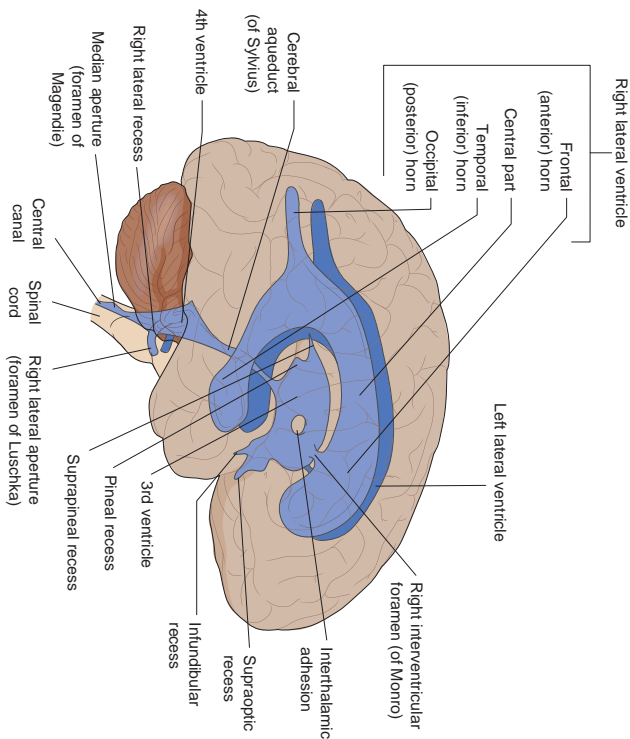
Name	Functions	Distribution
VIII: Vestibulocochlear	Hearing and balance	Internal auditory meatus
Cochlear division	Impulses related to hearing	
Vestibular division	Impulses related to equilibrium	
IX: Glossopharyngeal	Swallowing; conveying information on pressure and oxygen tension of blood	Pharynx, posterior third of tongue, parotid
X: Vagus	Somatic motor function; parasympathetic functions; speech	Pharynx, larynx, heart, lungs, esophagus, stomach, abdominal viscera
XI: Accessory	Rotation of head; raising of shoulder	Medulla and spinal cord
XII: Hypoglossal	Movement of tongue	Intrinsic muscles of tongue

Brain—Right Lateral View

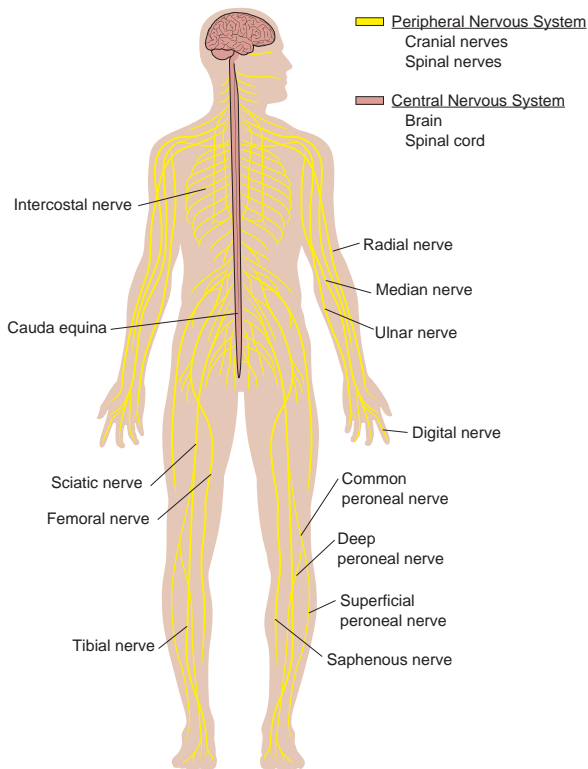
53



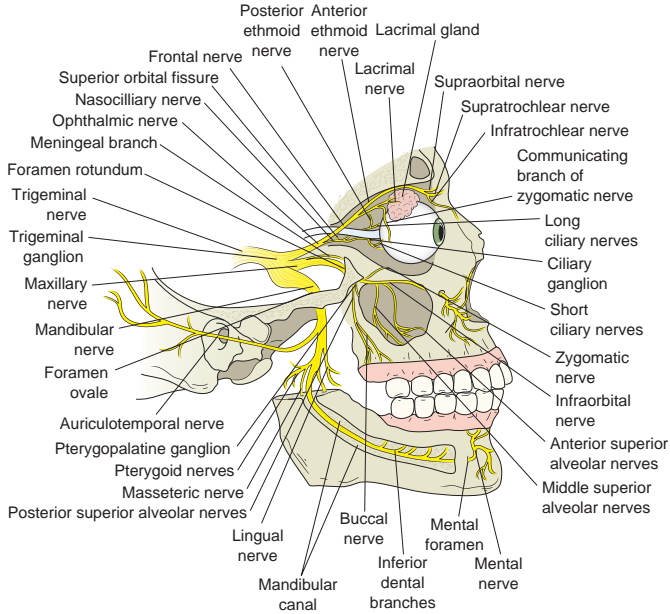
Ventricles of the Brain—Right Lateral Phantom View

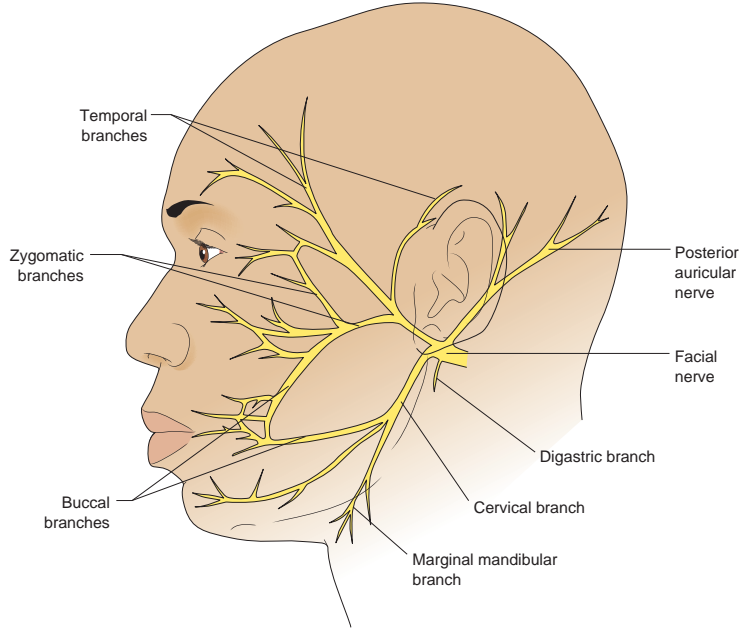


Central and Peripheral Nervous System



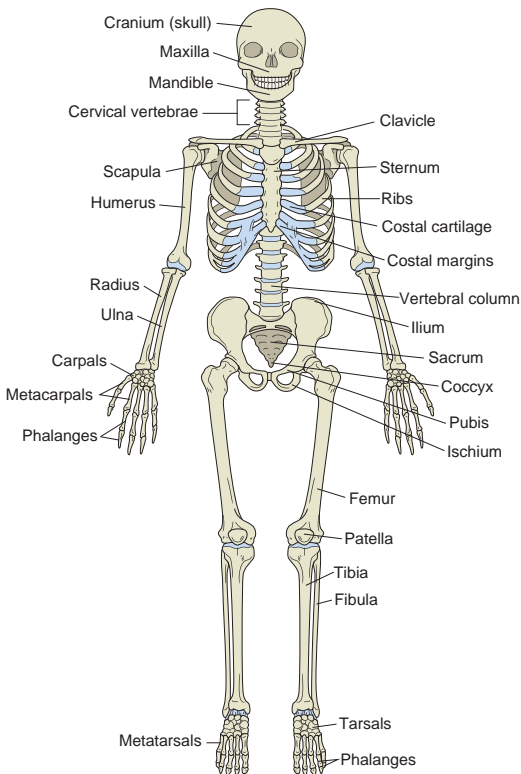
Trigeminal Nerve—Right Lateral View

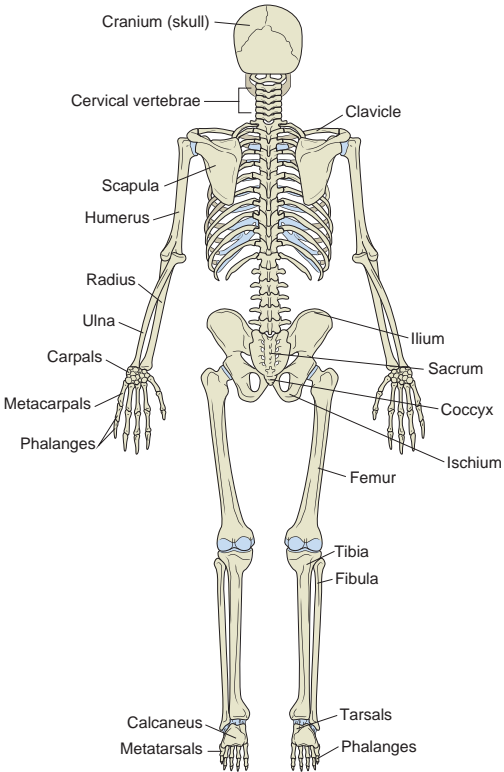




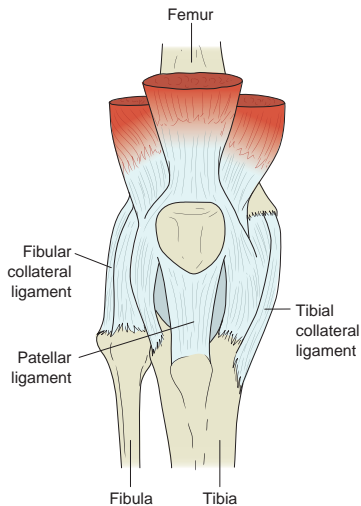
Ortho

The bones and muscles

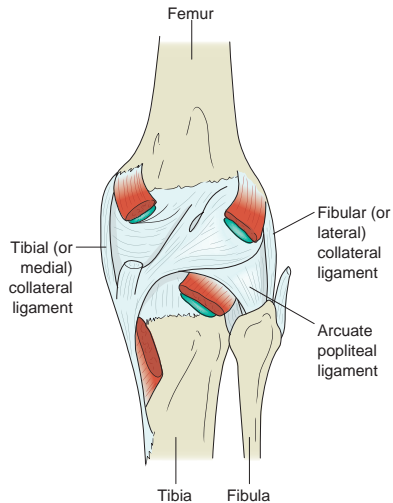
Skeletal System—Anterior View

Skeletal System—Posterior View

Superficial Ligaments of the Right Knee



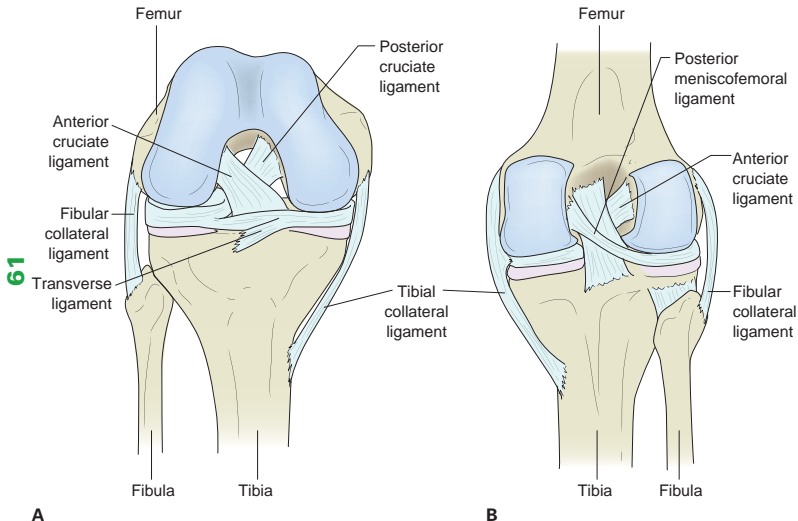
A



B

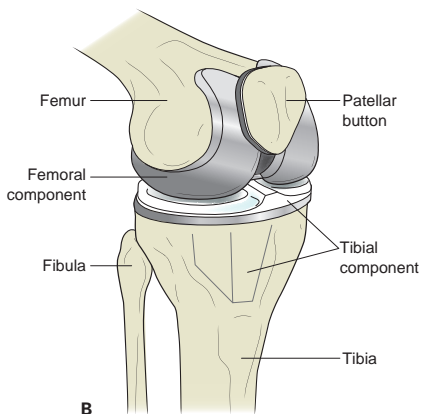
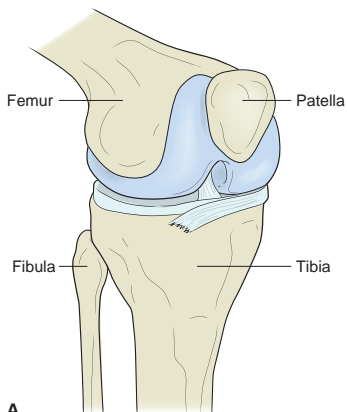
A. Anterior view, B. Posterior view

Deep Ligaments of the Right Knee



A. Anterior view, B. Posterior view

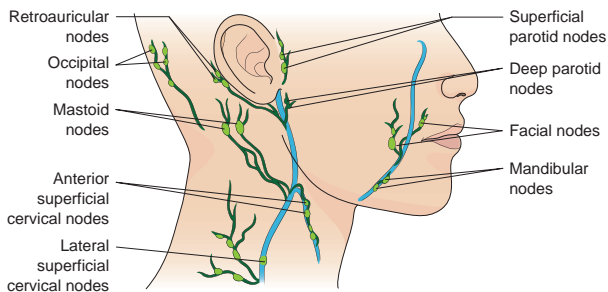
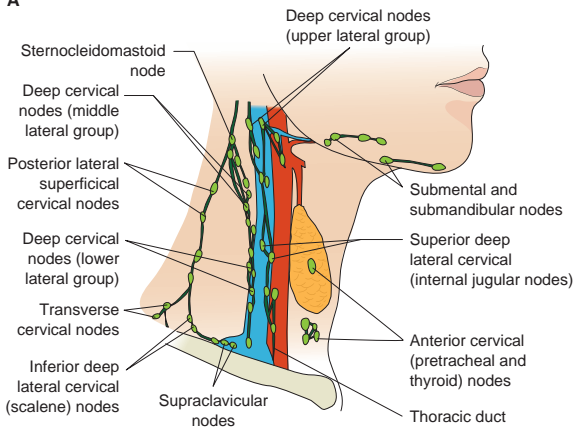
Total Knee Replacement



A. Normal knee,
B. Postoperative
condition

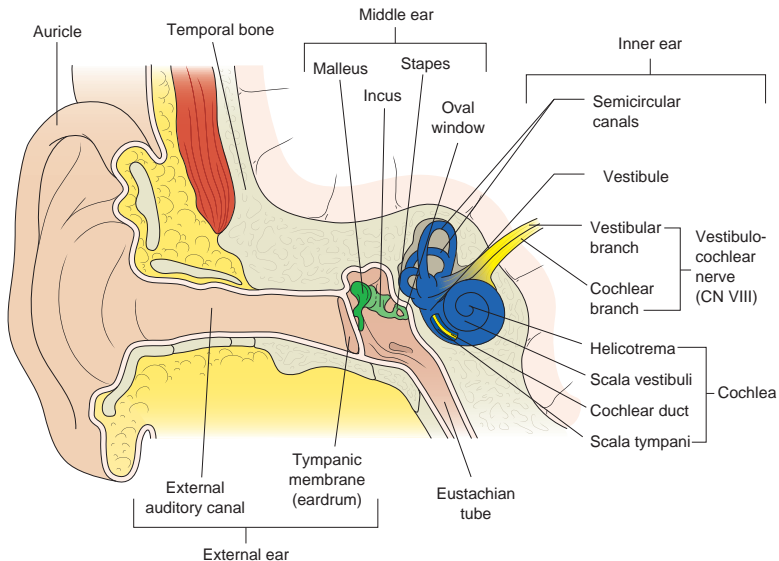
Ears, Nose, and Throat

Lymphatics of the Head and Neck

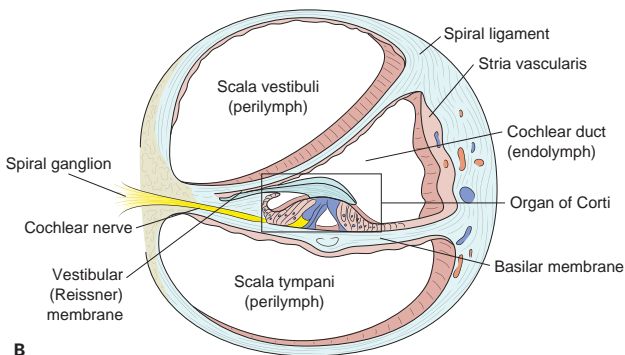
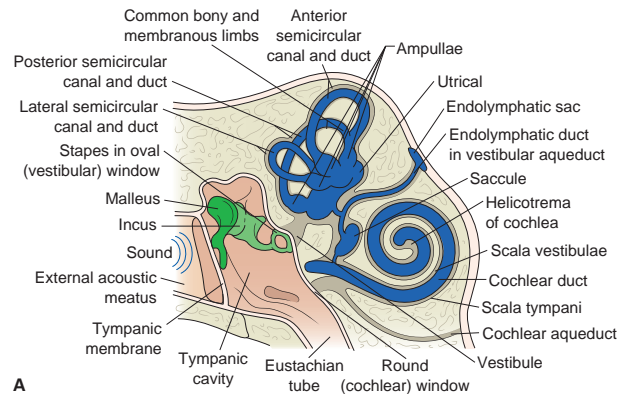
**A****B**

A. Superficial lymph nodes, B. Deep lymph nodes

Ear—Right Frontal Section

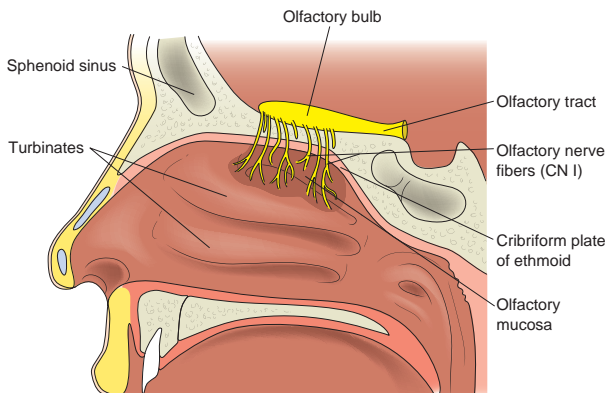


Cochlea and Labyrinths

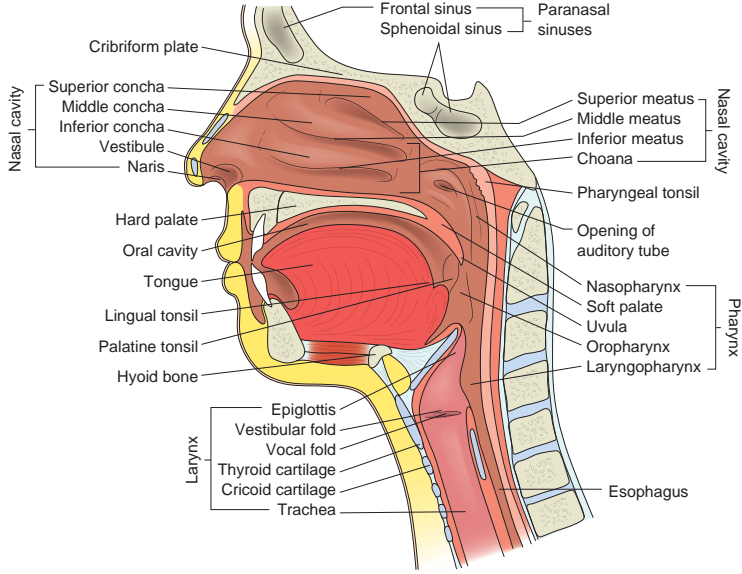


A. Labyrinths, B. Cochlea: Cross-section

Nasal Cavity—Midsagittal Section

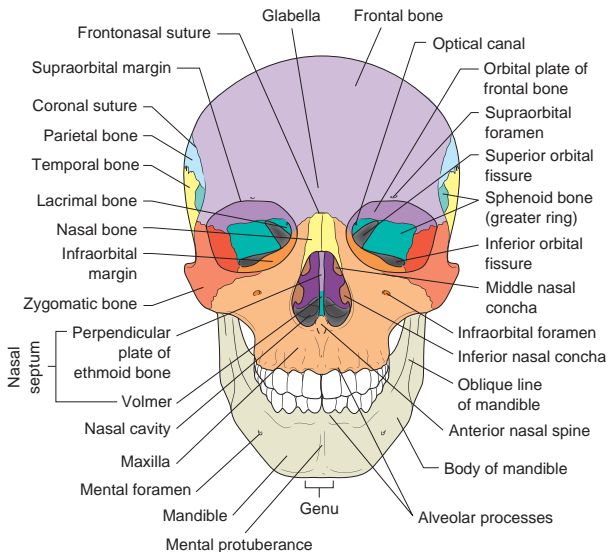


Nasal Cavity, Pharynx, and Larynx—Midsagittal Section



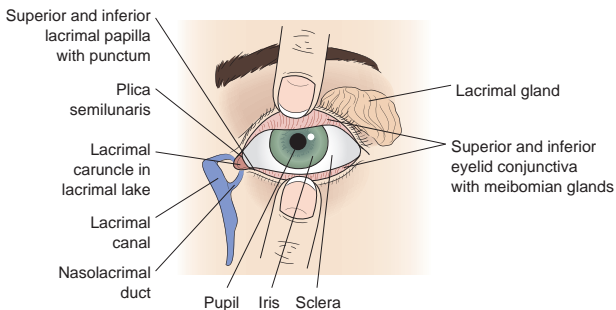
Maxofacial

Facial Bones—Anterior View

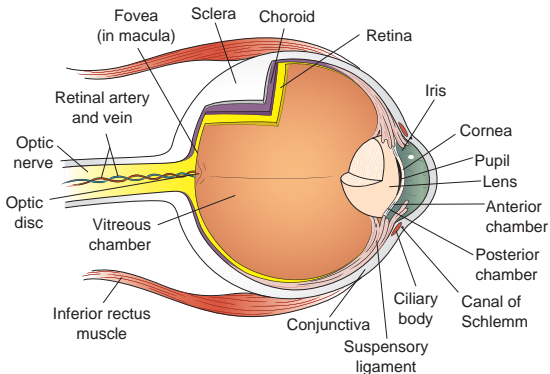


Eye

The Eye



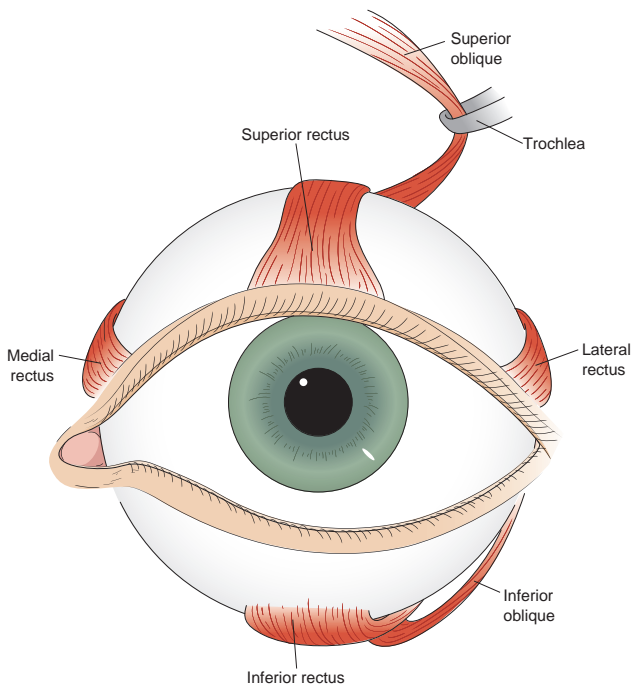
A



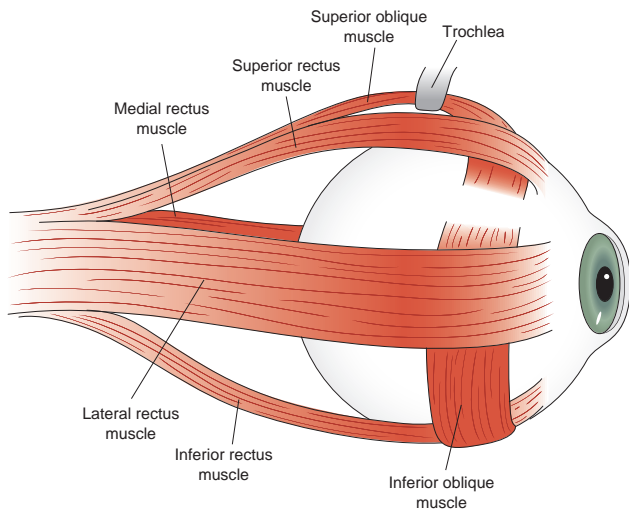
B

A. Anterior view, B. Cross-section

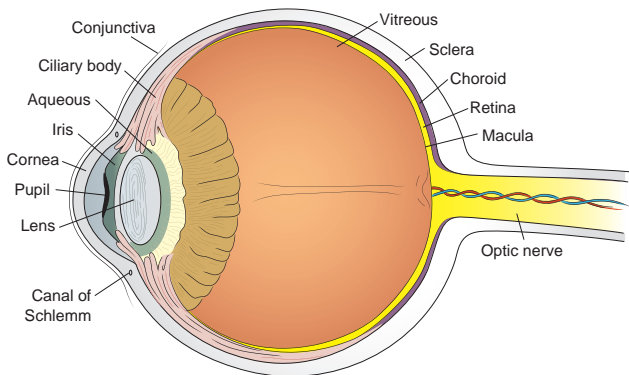
Frontal View of Eye Muscle



Lateral View of Eye Muscle

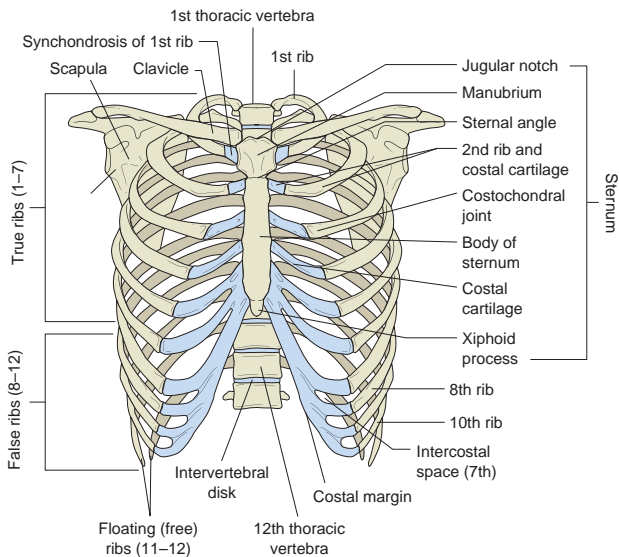


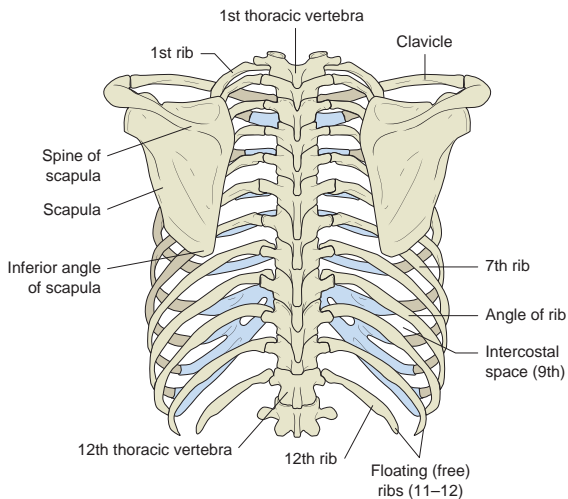
Internal Anatomy of the Eyeball



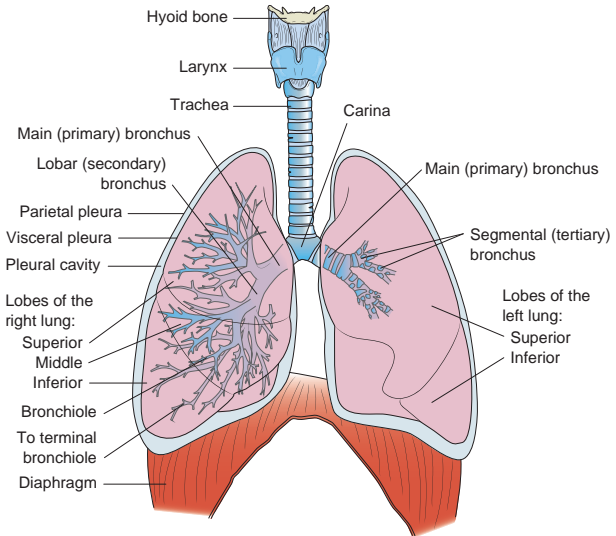
Thoracic/Cardio

Lungs, mediastinum, and heart

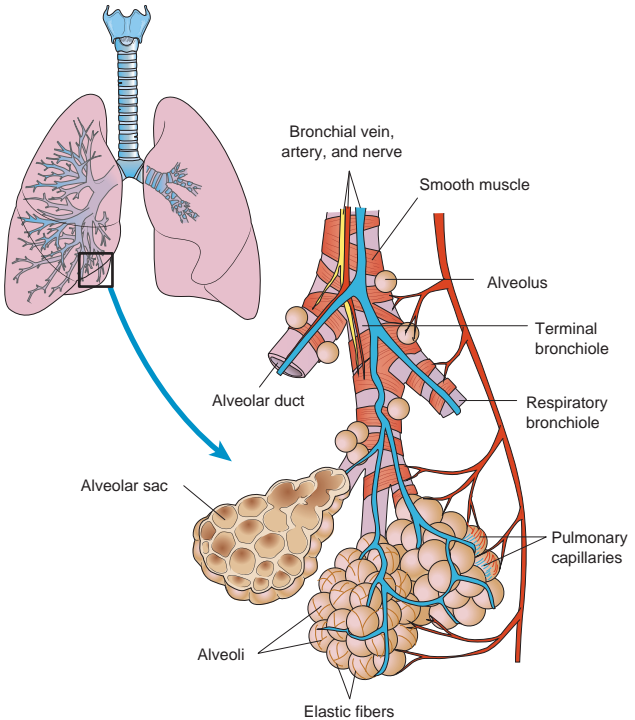
Thorax Bones—Anterior

Thorax Bones—Posterior

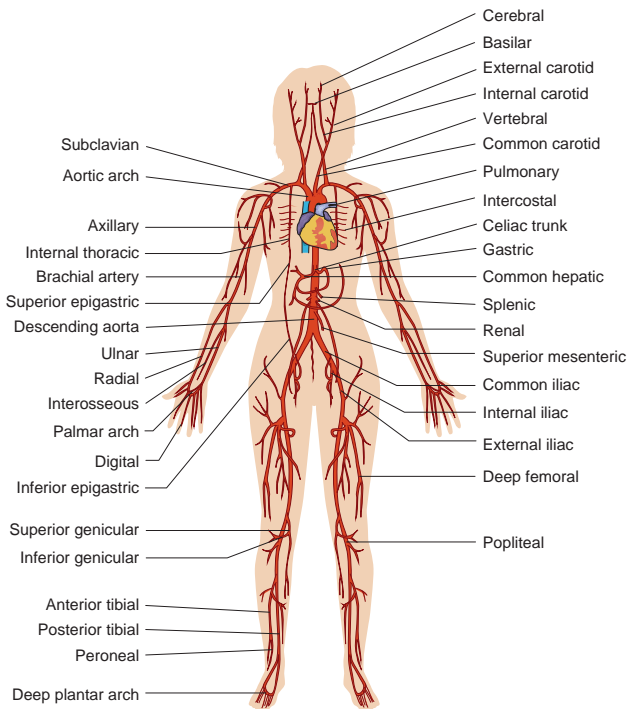
Lungs—Anterior View



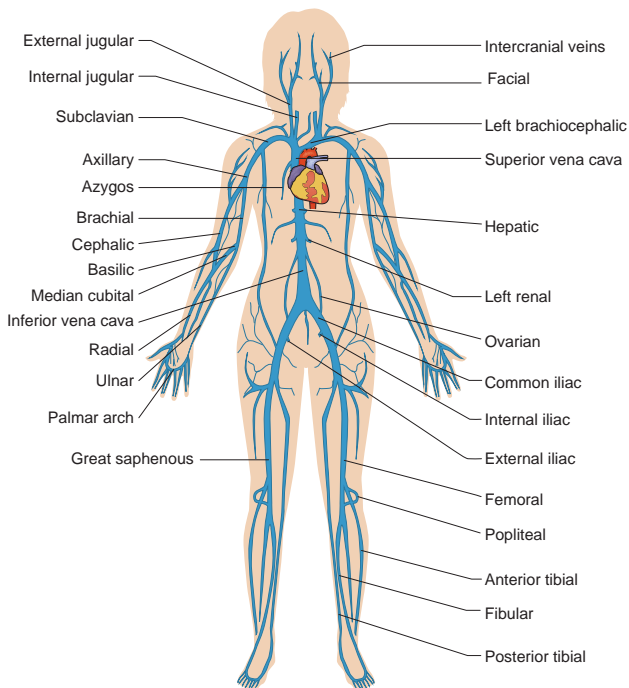
Bronchiole and Alveoli—Anterior View



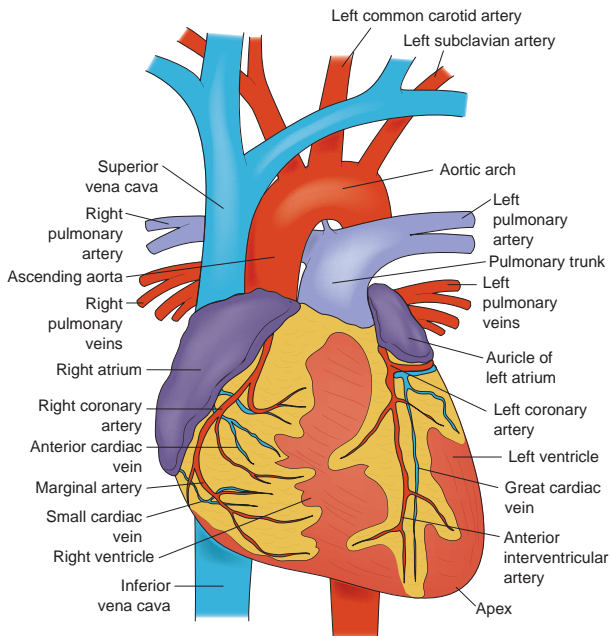
Arteries



Veins

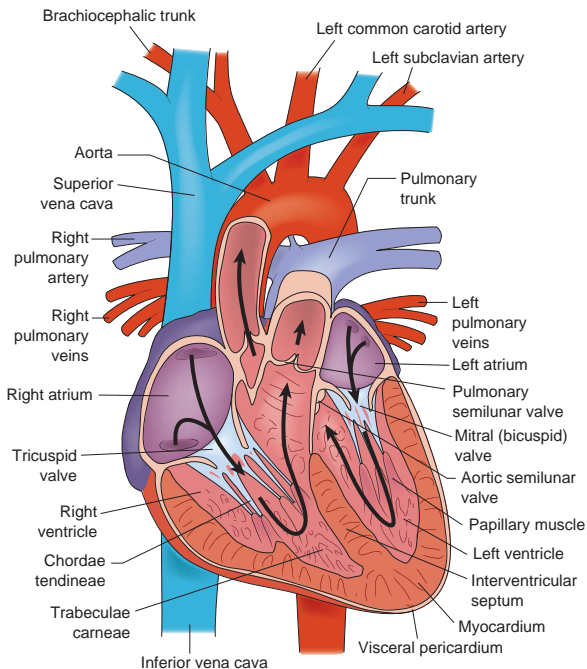


Heart



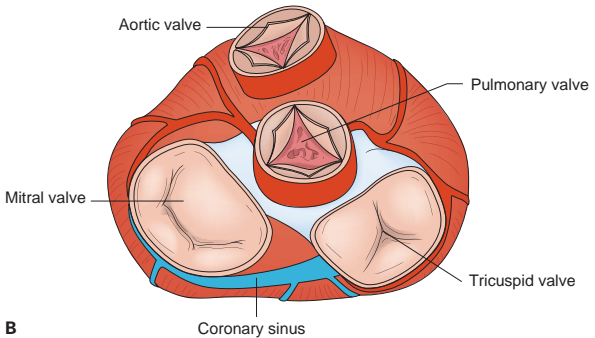
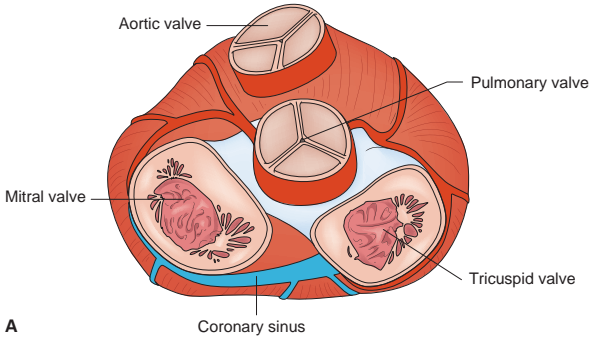
A. Anterior view

Heart



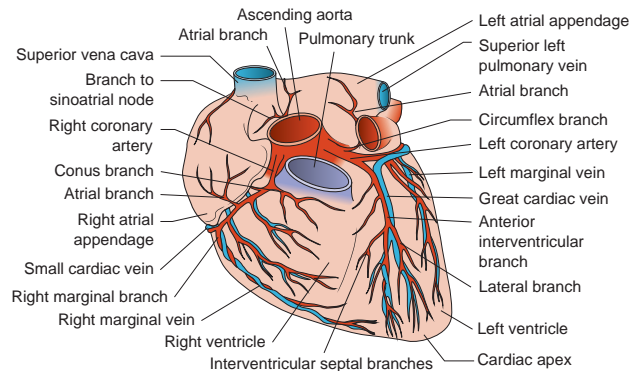
B. Anterior section (arrows show direction of blood flow)

Heart Valves—Superior View with Atria Removed

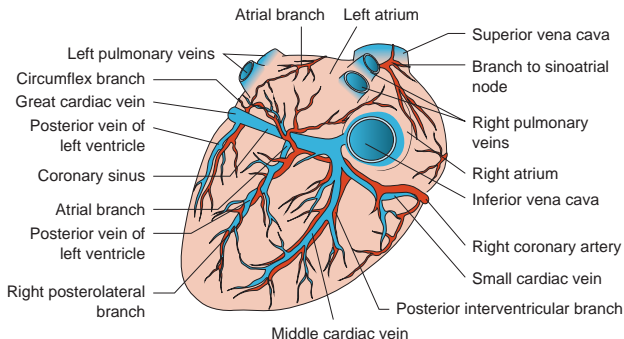


A. Diastole, B. Systole

Coronary Arteries and Veins



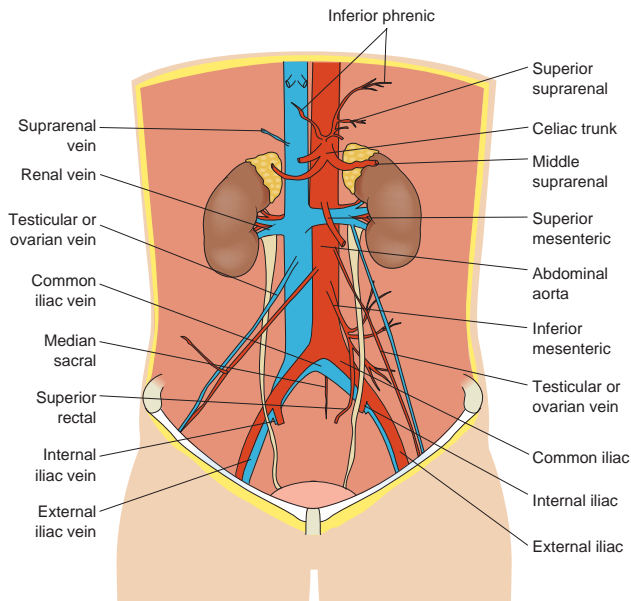
A



B

A. Anterior view, B. Posterior view

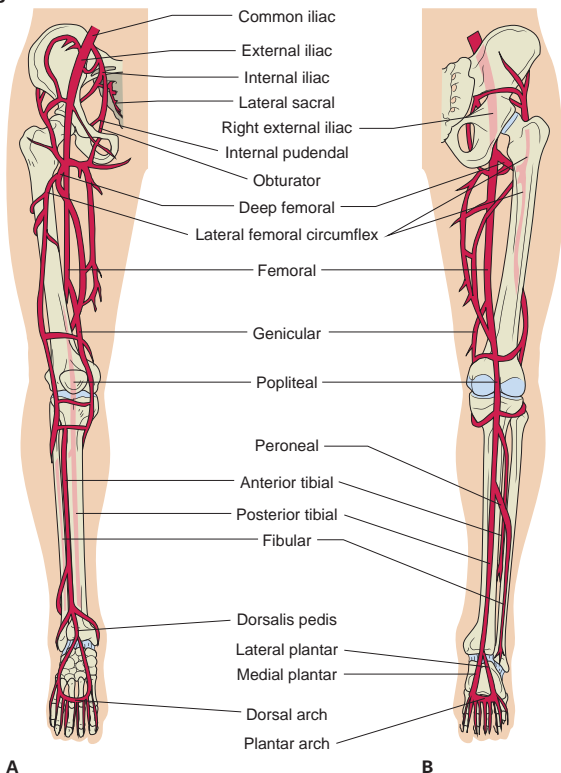
Abdomen Arteries and Veins



Peripheral Vascular

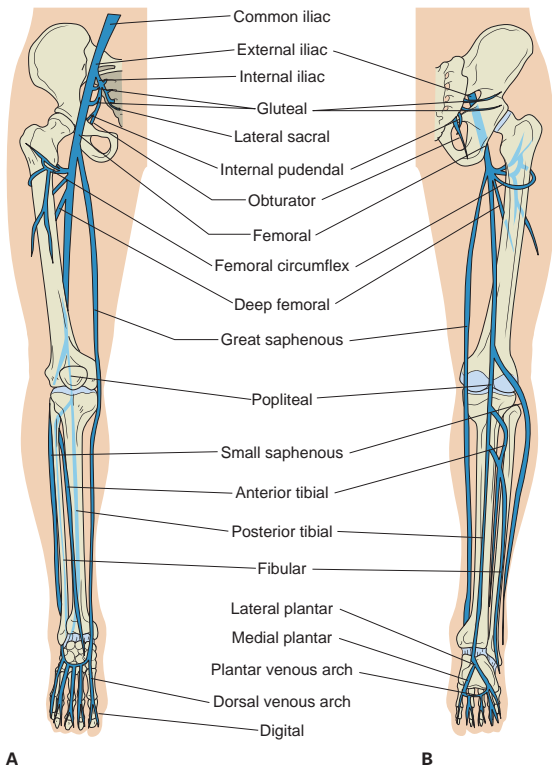
All vessels

Leg Arteries



A. Anterior view, B. Posterior view

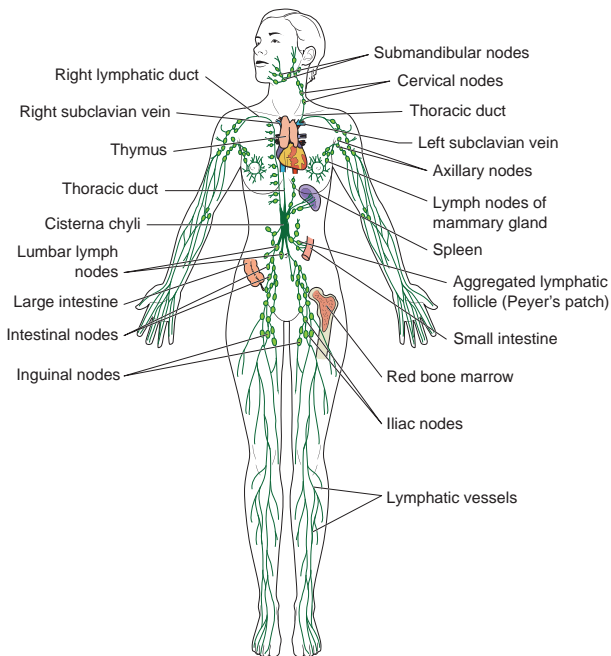
Leg Veins



A. Anterior view, B. Posterior view

Lymphatic System

Lymphatic System—Anterior View



Open vs. Laparoscopic Surgery

	Open	Laparoscopy
Procedure	Done through larger incisions held open by retractors so the area under operation can be seen freely	Done using scoped instruments placed through very small incisions into body cavity that has been inflated with CO ₂ for visibility
Patient positioning	Same	Same
Instruments	Major set Large retractors	Minor set Trocars Cannulas
Equipment	Suction unit ESU Warmer unit (Basic for both types of cases)	Scopes Video towers (TV monitor, light source) Camera

Basic Open Case Set-Ups

Mayo Stand Set-Up for Open Cases

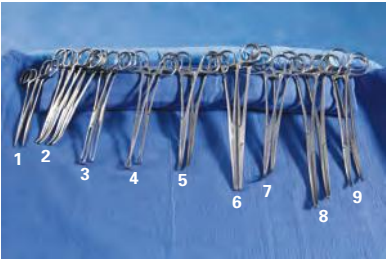
- The Mayo stand is your working station.
- Strategically position the Mayo stand for easy access. Keep it close to you so you do not need to overreach for something.
- There is no right or wrong way to set up your Mayo stand. What is important is that you know where your instruments and supplies are at all times.
- Set up the Mayo stand for the procedure's early steps with your smaller, shorter instruments first at hand. You will need your longer, heavier instruments as the surgeon deepens the surgical site.
- Keep the Mayo stand free of clutter.
- Know where your countable items are at all times.
- Anticipate your surgeon: Always have something in your hand ready to give him or her.

Hemostasis must be maintained during open cases. The surgeon may choose to use hemostats or an electrosurgical (cautery) unit. Know the surgeon's preference so you can have it at the ready.

Basic Mayo Set-Up for an Open Case



A Strategy for Setting Up Your Forceps and Clamps for an Open Case



■ Items to include:

1. Mosquitoes
2. Criles
3. Allis
4. Babcocks
5. Kellys

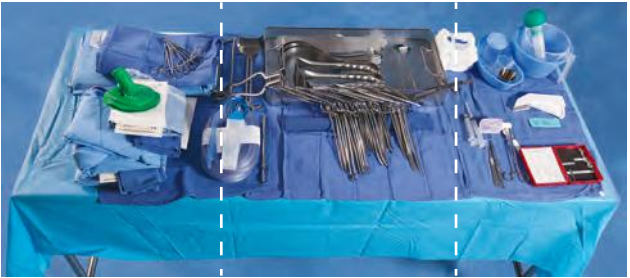
6. Kocher
 7. Right angles
 8. Peans
 9. Schnidt
 10. Pick-ups (not shown)
- Small retractors will be needed first. (Large retractors or self-retaining retractors will remain on the back table until the surgery proceeds and these are needed.)
 - Scalpels should be loaded and ready.
 - Ties on a reel or straight ties go on the end of the Mayo stand.
 - Two needle holders should be on the Mayo stand for stick ties.
 - As the case continues, you will change the contents of the Mayo stand by pulling instruments from your back table to meet the needs of the surgeon and procedure.

Back Table Set-Up for Open Cases

- The back table is an extension of your Mayo work station.
- Place instruments you will not need initially on the back table.
- The back table is also where you place the stringer of instruments. From the stringer, you choose what will be on your Mayo stand for set-up.



- The back table is divided into thirds.
 - One-third is the working station put closest to the Mayo stand on the right or left, depending on where you will stand.
 - The middle one-third is where the instrument pan is located. A rolled towel is placed in front of the instrument pan.
 - The far one-third is the holding area where the surgeon's and assistant's towels, sterile gowns, and sterile gloves are held until needed.
 - All drapes are placed in this area, along with any extra towels.
 - This area is the farthest away from the Mayo stand. You will not need this area often during the case.



Minor Instrument Set vs. Major Set: General

- A minor set is for smaller type cases like a breast biopsy. Smaller instruments will be used because the procedure will not be proceeding deeply into the tissue.



- Self-retaining retractors and longer hand-held retractors may be included in the major set.



- A major set is for larger cases, such as bowel or kidney surgery, that require longer, heavier instruments, since the surgery will proceed deeper into the abdominal cavity.



Medications and Solutions on the Back Table

🎯 **LABEL all drugs and solutions used in surgery.**

- You must be aware of what medications are on your sterile field.
- Label every drug and solution on your back table, even normal saline. Since many solutions you will use are clear, labeling is imperative.
- Label your asepto and syringes also.
- Handing a medication to a surgeon without knowing what it is could kill the patient.
- Surgeons depend on you. Although they know what they need, they are busy working in the wound and need to be reminded of what you are giving them.



For more information on medications used in surgery, see Tab 4.

Laparoscopic Cases

- Laparoscopic cases do not use a large incision but rather 3 to 5 tiny incisions to accommodate the scopes. A Hasson trocar or Veress needle is placed in the umbilicus, tubing is attached, and the peritoneum is filled with CO₂ to establish a pneumoperitoneum.
- Counting of sponges, sharps, needles, and any miscellaneous supplies is always required, no matter what kind of surgery.
- Instrument counts are not always needed because of the tiny incisions used for laparoscopic surgery. It is always a good idea, however, to do an initial count in the event an open procedure develops. Some hospitals require a count. Know your facility's policy.
- You must always be ready to open in the event of an emergency.

Mayo Stand Set-Up for Laparoscopies

You will need:

- Laparoscopic instrumentation
- Equipment to insufflate the body cavity with CO₂ to establish the pneumoperitoneum
 - Some surgeons use a Veress needle.
 - Trocars of various sizes, as per surgeon's preference.

Many surgeons prefer the Hasson approach, which is similar to a mini-laparoscopy. The surgeon makes an incision in the umbilicus to visualize the insertion of the Hasson trocar in the abdomen. The approach is blind when the surgeon uses a Veress needle.

A Strategy for Setting Up Your Mayo Stand for a Laparoscopic Case

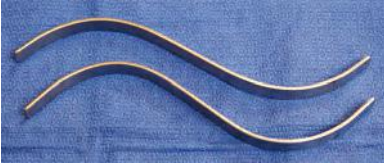
Items to include:

- Veress needle or Hasson trocar system
- Trocars
- Camera
- CO₂ tubing
- Camera tubing
- Light cord
- Scope
- #11 or #15 knife blade for the incision



- Small retractors—Hasson or Miller-Senns
- Minor instrument set (a major set would be needed if the case changes to open)

Hasson Retractors



Back Table Set-Up for Laparoscopies

- The only differences between the back table set-up for an open case and a laparoscopic case are the instruments and sponges.
- You will have a laparoscopic instrument tray with your laparoscopic graspers, Babcocks, Marilyns, and so on.
- Usually ray-tec sponges are used during laparoscopies because they are smaller and show up on an x-ray.



The Counts

Retained surgical items (RSIs)—items left in the patient—are preventable events. The team must ensure that no surgical item is left in the patient at the end of the case by accounting for each item during the procedure. You can expect a multidisciplinary system and team approach to be in place in every OR to preempt RSIs. The primary prevention strategy is the surgical item count.

- As recommended by the AORN and the AST, you must count three times during an open case. At each time, you count all sponges, sharps, needles, Bovie parts, and anything else your facility deems necessary.
- As a scrub person, count before you open, count during the peritoneum closing, and count when the skin is being closed. A fourth count is needed when a cavity is entered (the uterus, bladder, or stomach). Count three times even if no body cavity is entered.
- *Do not count with another CST; this step must be done with the RN circulator. This is a recommendation of the AORN and AST standards.*
- Count with the RN circulator, loudly enough to be heard by each other. If necessary, request quiet to allow the scrub person and RN circulator to focus on the counting procedure.
- Make sure the counts are written correctly on the white board and count sheet by the RN circulator and documented correctly by the RN circulator.
- Any team member (e.g., second circulator CST, float RN) who opens sterile items onto the sterile field should count the items with the scrub person, add the counted items to the count documentation, and promptly inform the RN circulator about what was added.
- Remember your first count so you know what items you have added.
- If you identify a discrepancy, speak up immediately. Don't wait.
- As you repeat procedures, you will remember when to do your counts and become timelier with them.
- Always anticipate, communicate clearly, and pay attention!

Always perform your counts as taught or as your facility directs.

Count Order

Common Order for Count Locations

Before the Case Starts

1st: Back table

2nd: Mayo stand (if set up)

- The first count gives you a baseline for what items you start with.
- Remember and record all items you add during the case (e.g., sponges, sharps, needles, extra instrumentation). The circulator will also sterily add items and write them down as they are added. The circulator must remember what is added.

During a Case

1st: Field-patient area

2nd: Mayo stand

3rd: Back table

Last: Off the surgical field (i.e., anything that has been dropped during the case)

- Make sure all instruments and surgical items recovered from the operative site are intact and complete.

Common Order for Item Counts

1st: Sponges

2nd: Sutures, sharps, Bovie tips, etc.

Last: Instruments according to your facility policy

- Do not deviate from the count procedure: deviation can lead to human error. Be deliberate in the count and be consistent in the application and adherence to standardized procedures.

Tips

- Do not give the surgeon more sponges or laps than he or she needs.
- Use an exchange basis: If you give out two sponges, make sure you get two sponges in return.
- Keep up with your counts as the items are given to you.
- Remember how many towels are used in big abdominal cases. It is possible to leave them behind.
- At the end of a vaginal case, the surgeon may clean out the vaginal vault and use packing. A sponge could be left in the cul-de-sac at this point. Be mindful of this and check your current sponge count against your last count.

- Kitners/peanuts should be kept on an instrument when they are not in the holder.
- Cottonoids should be wrapped on the cardboard when not in use.
- Sharps should be contained in specified areas of the sterile field so you know where they are and do not cut yourself.

Remember: Count four times if in a cavity. When closing the bladder, uterus, or stomach, you must add *the cavity* to your count.

Incorrect Counts

- If the count reveals that more items have gone out than have come back, it is your responsibility to tell the surgeon.
- A few surgeons may respond to the report of a missing item with impatience or annoyance.
 - Know your field and stand your ground when you know you are right. You can be firm while still being professional.
 - Saying, “May we do that count again? I think I missed something,” could be a diplomatic way to get a second count.
 - Always say “please” and “thank you.”
- If the recount is still wrong, the team must conduct an all-out search of all areas—the field, the Mayo stand, the back table, and off the field, as well as the trash and floor, if needed.
- If the recount remains incorrect, the surgeon will order an x-ray to check whether the missing item is in the patient.

Know your facility’s policy and adhere to it.

EMERGENCIES

- In a true emergency, counts may not be done due to the time factor.
- The circulator is in charge of the operative report, but it is acceptable to ask and confirm the case is recorded as an emergency. Check your hospital policy and follow it.
- Take an x-ray at the end of the case to check for RSIs.

Units of Measure

Unit(s)	Metrix Prefix	Decimal Form
1000	kilo	1000
100	hector	100
10	deka	10
One tenth	deci	0.1
One hundredth	centi	0.01
One thousandth	milli	0.001
One millionth	micro	0.000001

Most Often Used Abbreviations

milliliter	mL
liter	L
cubic centimeter	cc
grain	gr
microgram	mcg
milligram	mg
gram	gm or g
kilogram	kg
ounce	oz
pound	lb
teaspoon	tsp
tablespoon	tbsp
pint	pt
quart	qt
gallon	gal
millimeter	mm
centimeter	cm
meter	m

Continued

Units of Measure—cont'd

Equivalents for Liquid Measurements

1 gal = 4 qt = 8 pt = 128 fl oz = 3.785 L = 3785 mL

1 qt = 2 pt = 32 fl oz = 946 mL

1 pt = 2 cups = 16 fl oz = 473 mL

1 cup = 8 fl oz = 16 tbsp = 237 mL

1 tbsp = 3 tsp = 15 mL

1 tsp = 5 mL = 4 L = 1.057 gal

1 L = 1000 mL

1 mL = 1 cc

Equivalents for Solid Metric Measurements

Grains/lbs	Grams
1/250 gr	250 mcg
1/200 gr	300 mcg
1/150 gr	400 mcg
1/100 gr	600 mcg
1/12 gr	5 mg
1/8 gr	8 mg
1/4 gr	15 mg
1/2 gr	30 mg
1 gr	64.79 mg
1 1/2 gr	100 mg
5 gr	300 mg
7 1/2 gr	500 mg
10 gr	600 mg
15 gr	1 g
1 oz	28 g
1 lb	0.45 kg
2.2 lb	1 kg

Units of Measure—cont'd

Celsius vs. Fahrenheit

	Freezing	Body Temperature	Boiling	Thermal Death (spores)
CELSIUS	0°	37°	100°	121°
FAHRENHEIT	32°	98.6°	212°	250°

Temperature Conversion

Celsius to Fahrenheit: $(9 \times C)/5 + 32 = ^\circ\text{F}$

Fahrenheit to Celsius: $(F - 32)/9 \times 5 = ^\circ\text{C}$

Medications Used in Surgery

Antibiotics

Kanamycin (Kantrex), Gentamicin (Garamycin), & Sulfamethoxazole (Bactrim)	Used to prevent or treat an infection. Broad-spectrum cephalosporin antibiotics may be given to irrigate wounds, or given IV. Most commonly used drug in surgery.
Cefazolin (Ancef), Cefotetan (Cefotan), Kefzol, & Keflin	Cephalosporins, broad-spectrum antibiotics that can be given mixed with saline or Ringer's lactate for wound irrigation or IV.
Penicillin	Broad-based antibiotic used to destroy pathogenic bacteria.
Tetracycline (Sumycin) & Doxycycline (Vibramycin)	A broad-based bacteriostatic antibiotic. Effective on both gram-positive & gram-negative bacteria.
Vancomycin (Vancocin)	For systemic infections. Mainly used for resistant staph & enterococcal infections. Given only IV (not absorbed in the GI tract). If given too fast IV, an adverse reaction can occur, called "red man syndrome" from the red flush across the neck & upper body.

Continued

Medications Used in Surgery—cont'd

Bacitracin	Used in irrigation solution as a prophylactic during surgical procedures. Used in orthopedic cases frequently. Mix well & sterilely transfer from the RN circulator to the sterile CST. A broad-based bacteriostatic antibiotic.
Metronidazole (Flagyl)	Used IV, usually preoperatively. Given over a 30–60 min period. Frequently indicated before colorectal procedures. Not effective against aerobic organisms. A bactericidal to both protozoa & anaerobic bacteria.
Anticoagulants	
Heparin (IV)	Used to thin the blood & prevent thrombosis. Heparin is IV only & is used during surgery to prevent blood clotting, especially during vascular cases. Heplok flush can also be used as a flush on the back table (for vascular ports, sheaths, etc.). Pay attention to the strength per mL. The vial volume can be the same, but vials contain either 10 or 100 USP units per mL. Reversal agent or antagonist is protamine sulfate.
Warfarin (Coumadin)	Used to prevent the formation of clots. Oral only; discontinued before surgery. Reversal agent is vitamin K (mephyton or aqua mephyton).
Bronchodilators	
Aminophylline & Ephedrine sulfate	Used to open up & relax bronchi so patient can breathe more easily.
Cardiac or Emergency Drugs	
Digitoxin or Lanoxin	Used to increase output of the heart & strengthen the heart. Do not give if the heart rate is below 60 bpm. Must count for a full minute for accuracy.

Medications Used in Surgery—cont'd

Nitroglycerine	Used to increase blood flow by dilating coronary arteries.
Nitroprusside sodium (Nipride)	Used for hypotension during anesthesia & vascular cases. Given IV but not to patients with acute heart failure or those who have decreased cerebral circulation.
Epinephrine (Adrenalin)	Adrenergic drug used to increase BP & dilate bronchioles. Used for anaphylactic reactions & shock.
Lidocaine (Xylocaine) & Pronestyl	Antiarrhythmics used to help correct cardio arrhythmias.
Contrast Media/Dyes	
Hypaque, Renografin, Conray, Omnipaque, Hyskon, etc.	Media used in surgery or x-ray to make certain areas radiopaque. Many contain iodine, so you must check if the patient is allergic to shellfish or iodine.
Methylene Blue	Used to check structures for patency in GYN or urological cases. Used for marking skin before the case.
Ophthalmologic Agents	
Atropine, Cyclogyl, & Tropicamide	Mydriatics used to dilate the pupil of the eye.
Miochol & Pilocar	Miotics used to constrict the pupil.
Zolyse & Chymar	Used in cataract cases to dissolve zonules, which hold the lens in place.
Healon & Viscoat	Viscoelastic agents (jelly like) used to keep the eye expanded during cataract surgery.
Hemostatic Agents	
Thrombin, Bone wax, Gelfoam, Oxygel, Surgicel, & Avetene	Used to slow the flow of blood during surgery.

Continued

Medications Used in Surgery—cont'd

Diuretics

Furosemide (Lasix)	Used to increase urinary output; helps control hypertension and edema. Frequently used diuretic. Commonly used during ophthalmic & neurosurgery procedures.
Mannitol (Osmitrol)	Used to decrease intracranial & intraocular pressure. Dosage is determined by patient's weight & condition.

Dyes

Methylene Blue, Indigo carmine, Gentian violet, & Brilliant green	Used to see viscera or mark skin for incisions, as in plastic surgery. Careful prepping is needed to ensure marks are not removed.
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Stains

Lugol's solution	Used to stain abnormal tissue. This iodine-based solution is used in cervical cases and for Shiller's Test. Check patient for allergies to shellfish or iodine.
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Malignant Hyperthermia Drug

Dantrolene (Dantrium)	<p>Skeletal muscle relaxant used in treatment of malignant hyperthermia</p> <p>36 vials need to be available in surgical area where MH can occur.</p> <p>A MH cart is in the OR department for emergent response.</p> <p>MH is a rare response to anesthesia meds and especially succinylcholine. The patient will show tachycardia, high core temperature, & muscle rigidity.</p> <ul style="list-style-type: none"> • Anesthesia provider immediately turns off anesthetic machine & stops all anesthesia drugs, especially succinylcholine. • Surgery stops. • Give Dantrium as stated above.
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Medications Used in Surgery—cont'd

Intravenous Solutions	
Normal saline, Dextrose 5% in water, Dextrose in normal saline	(0.9% NS or 0.45 NS) (D ₅ W) (D ₅ NS) Used to hydrate during surgery cases.
Ringer's lactate solution and Ringer's solution	Used for correcting electrolyte imbalance. Also used as an irrigation to flush wound at end of procedure.
Irrigations	
Sterile normal saline/ NaCl	Used to flush wound at end of procedure to check for bleeders & irrigate wound. Most frequently used irrigation. Antibiotics may be added to decrease possible infection.
Glycine	Used for urological procedures as an irrigation solution. It can be used with the ESU because of its nonconducting properties.
Sorbitol	Only used for a urologic irrigation solution during transurethral cases such as a TURP

Anesthesia and Anesthetic Agents

- Anesthesia means “without sensation.” The anesthetized patient may be conscious or unconscious for a case.
- General and regional are the two major types of anesthesia.
- Regional anesthesia includes spinal, caudal, epidural, nerve block, Bier block, local injection, topical, and Monitored Anesthesia Care (MAC; the patient is awake but sedated).

Anesthetic Agents

Preoperative Drugs

Robinul & Atropine	Used to dry up secretions. They are anticholinergics.
Ativan, Versed, Vistaril, & Phenergan	Antianxiety type drugs; they decrease nausea and are antihistamines.
Zofran, Reglan, & Inapsine	Antiemetics used to decrease nausea & vomiting.
Zantac & Tagamet	Antacids used to reduce gastric volume & acidity.
Fentanyl (Sublimaze), Morphine, Demerol, & Dilaudid	Narcotic analgesics. They potentiate anesthesia & decrease pain during surgery.

Inhalation Anesthetics

Nitrous oxide (piped in or in a blue tank)	Gas used in conjunction with intravenous anesthesia. Very volatile.
Halothane (Fluothane)	A liquid used for smooth, rapid induction. A maintenance anesthetic. Ethrane & Forane are similar type anesthetics.
Desflurane (Suprane)	Safe for liver patients. Has a rapid onset & a very strong smell.
Sevoflurane (Ultane)	Used in pediatric cases due to its rapid onset & recovery.

Intravenous Anesthetics/Monitored Anesthesia Care (MAC)

Propofol (Diprivan)	Milky type liquid for short procedures
Ketamine hydrochloride (Ketalar)	Used for short procedures. Must avoid loud noises with this drug.
Etomidate (Amidate)	Used in trauma patients or those with a compromised cardiac condition.
Innovar	Used for short procedures. Can be given IV while the patient is awake.

Anesthetic Agents—cont'd

Neuromuscular Blockers


Succinylcholine (Anectine)	Used to manage laryngospasms & endotracheal placement. Can trigger malignant hyperthermia. No known reversal agent exists.
Tracrium, Pavulon, Norcuron, & Zemuron (all brand names)	Nondepolarizing neuromuscular blockers, which take longer to act & have a longer duration.

Narcotic Reversal Agents/Antagonists

Naloxone (Narcan)	Used for narcotic reversal.
Flumazenil (Mazicon)	Used for Versed reversal.

Local/Regional Agents

Cocaine	Used in nasal cases for vasoconstriction; topical use only.
Lidocaine (Xylocaine)	Short-acting; can be a local infiltration or IV. Comes in 0.5% to 4% strengths.
Bupivacaine (Marcaine, Sensorcaine)	4x more potent than lidocaine. Comes in 0.25%, 0.5%, and 0.75% strengths.
Mepivacaine (Pontocaine, Carbocaine)	Used in ocular instillation as a topical agent.
Epinephrine	Used in locals, spinal, & epidurals. Acts as a vasoconstrictor & to prolong anesthetic effect.

 **Note:** Do not inject local anesthetic containing epinephrine into the digits (toes, fingers), nose, or penis. This would severely reduce the blood supply to these areas, possibly causing death to the tissue.

Vials containing a mix of epinephrine and local anesthetic may use red on the label.

Vials of local anesthetic that do not contain epinephrine may use blue on the label.

Read the label; do not use color as the only indicator.



Intraoperative Phases of General Anesthesia

Induction	Start induction of anesthesia agents, then inject a muscle relaxant. Place the endotracheal tube or use a laryngeal mask (LMA) to control respirations.
Maintenance	Starts after insertion of the airway & continues until the procedure is completed.
Emergence	When the procedure is finishing, discontinue anesthesia & allow it to wear off. Remove the endotracheal tube once the patient is breathing independently.
Recovery	Stabilization of vital signs starts this phase. Move patient to the post-anesthesia care unit for recovery.

The Four Stages of General Anesthesia

Stage I	Amnesia	Starts with the anesthesia from consciousness to unconsciousness.
Stage II	Excitement	Starts with unconsciousness and ends with loss of eyelid reflex; usually very short.
Stage III	Surgical anesthesia	Patient no longer feels pain or sensations.
Stage IV	Overdose	Patient has respiratory failure that leads to circulatory failure and then to death.

Awake under Anesthesia

- A patient can be awake under anesthesia but unable to move or speak.
- Remember: Hearing is the last faculty to go and the first to come back during induction and reawakening. Assume that the patient can hear you. Be mindful of what you say during a case, regardless of whether the patient has regional or full anesthesia. Do not comment on the patient's weight, tattoos, or anything else you see. Be professional! (Example: A surgeon had a patient who came in for her post-operative checkup and told him every song that was played during her craniotomy surgery.)



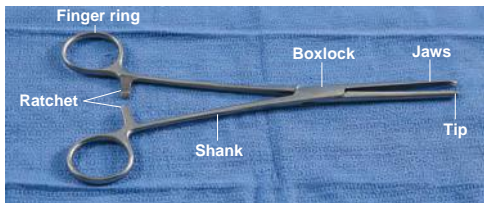
- The Bispectral Index (BIS) machine is used to help anesthetists and anesthesiologists know how deeply the patient is anesthetized.

Introduction to Instruments

- Among your many responsibilities in the OR setting, handing instruments to the surgeon and keeping your sterile field sterile are primary.
- You must know the instruments' names and aliases and understand their purpose and function to be proficient in your role.
- You may likely feel this is an overpowering task in the beginning. Many procedures use basic instruments; understand and learn them first. Build on the basics and keep adding to your knowledge of instruments as you work.
- The more you become knowledgeable about the instruments used in your facility, the more valuable you will be.
- Do not leave the room when serving as a STSR. Your responsibility is to be prepared so no one needs to leave the room to obtain supplies or instruments.
- The more you work with each surgeon, the better you will become at knowing what instrumentation he or she will want and need during the procedure.
- Pay attention and remember from case to case what is used. This will save time and keep the procedure flowing well.
- Keep things positive during the case.

Instrument Anatomy

Knowing the anatomy of your instruments is very important. It will help you understand when an instrument is not working properly.



Instrument Classification

Knowing instrument classifications will help you understand what you may need for a procedure.

Dissecting/Cutting

Handles: #3, #4, #7
 Scalpel: #10, #11,
 #12, #15, #20
 Mayo scissors
 Metzenbaum
 dissecting scissors
 Potts scissors
 Tenotomy scissors
 Wire cutters



Retracting

Army/Navy
 Balfour self-retractor
 Thompson
 Bookwalter
 Deaver
 Gelpi
 Harrington/
 sweetheart
 Parker
 Ribbon/malleable
 Richardson
 Senn
 Skin hooks
 Weitlaner



Clamping/Occluding

Hemostats
 Crile
 Kelly
 Mixer
 Tonsil/Schmidt
 PV clamps
 Right angles



Grasping/Holding

Adson forceps
 Adson-Brown forceps
 AllisBabcock
 Bayonets
 Bonnie
 DeBakey forceps
 Ferris Smith
 Gerald forceps
 Kocher
 Russians
 Towel clamp



Suturing/Stapling

Needle Holders

Crile-wood
Heaney
Mayo-Hegar
Ryder



Needle Holders



Staplers



Miscellaneous Instruments

Suctioning and Aspiration

These instruments remove body fluid, irrigation fluid, and blood from the surgical area, which enables the surgeon to see the area.

- Yankauer suction
- Poole suction
- Frazier suction

Viewing Instruments

Used to observe body cavities or structures.

- | | |
|--------------------|------------------|
| ■ Rectal speculum | ■ Nasal speculum |
| ■ Vaginal speculum | ■ Endoscopes |
| ■ Ear speculum | ■ Laparoscopes |

Minor Sets

Minor sets vary from facility to facility and are used for smaller procedures. The following is a typical minor back table set-up.



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Major Sets

Used in big cases such as large abdominal or thoracic procedures.





Instrument Names

The surgeon may use a different name for the instruments depending on where he or she was trained. Your facility may also use a different name for these instruments. Fill in the AKA (Also Known As) lines below to record the alternative name. Using any kind of nickname or word association to help you remember their names is helpful.

Kocher Clamp

- Traumatic clamp
- Has one tooth on the end of the clamp to “bite into” tissue
- Used for tough tissue like fascia
- Used by orthopedic surgeons to clamp onto bone
- AKA: _____



Babcock Forceps

- Atraumatic clamp
- Used in OB/GYN cases to grasp the fallopian tubes
- AKA: _____



Pennington Forceps

- Used to grasp tissue
- Used in intestinal procedures and/or rectal procedures
- AKA: _____



Allis Clamp

- Nontraumatic clamp
- Ends fold in to meet each other gently
- Used for clamping soft tissue like breast tissue
- AKA: _____



Mayo Scissors

Mayo scissors are relatively large and heavy.

Straight Mayos

■ Used for cutting sutures

■ AKA: _____



Curved Mayos

■ Used for cutting tough fibrous tissue

■ AKA: _____



Metzenbaum Scissors

■ Thin, sleek, and used for delicate tissue dissection

■ AKA: _____



Never cut sutures with Metzenbaum scissors. This dulls them.

Balfour Retractor

- Self-retaining retractor used in open abdominal cases—bowel procedures; remember to count each piece
- AKA: _____



O'Sullivan-O'Connor Retractor

- Self-retaining retractor used in open GYN procedures
- AKA: _____



Davidson Scapular Retractor

- Hand-held; used in shoulder and posterolateral thoracic procedures to retract the scapula.
- AKA: _____



Allison Lung Retractor

- Hand-held; used to retract the lung tissue in thoracic procedures.
- Its open design and thin flat wire are gentle on the delicate lung tissue.
- AKA: _____



Ferris Smith Forceps

- Used for heavy fibrous tissue
- AKA: _____



Bonney Forceps

■ Heavy, straight, and used for fascia

■ AKA: _____



Needle Holders vs. Clamps

Know the difference between needle holders and clamps.

■ Needle holders typically are stubbier at the working end, whereas clamps are usually slimmer and longer.

■ AKA: _____



Crile-Wood Needle Holder

(From Rutherford, Differentiating Surgical Instruments and Supplies, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 3.)

Crile Hemostatic Clamp

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 11.)

⚠ Never use your hands to load and unload the scalpel or to put it in the needle box. Always use your needle holder.

Staplers Used in the OR

Skin Stapler

Used to close skin as an alternative to sutures

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 24.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 24.)



Laparoscopic Staplers

Linear Cutter/Stapler or Gastric Intestinal Anastomosis (GIA) Stapler

- Used to cut and staple at the same time
- Used in abdominal and thoracic procedures
- AKA: _____

GIA Stapler

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 25.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 25.)



Linear Stapler

(From Rutherford, Differentiating Surgical Instruments and Supplies, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 25.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 25.)



End-to-End Anastomoses (EEA) Stapler

- Used for low anastomoses of the colon
- Placed in the rectum and used to anastomose the remaining parts of the colon together
- AKA: _____



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 23.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 23.)

Purse String Stapler

- Used in appendectomy procedures or bowel cases when a drawstring is needed to close the tissue
- AKA: _____



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 23.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 23.)

Ligaclip

- Used to close tissue in a variety of ways
- Used to clamp vessels and ducts as in a cholecystectomy
- AKA: _____



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 24.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 24.)

Laparoscopic Instrument Tray

- The instrument set will be a minor set with laparoscopic instruments.
- Its contents depend on the facility where you work.
- The instruments are long and narrow to be able to fit into the trocars.
- You will need a camera, light cord, and CO₂ tubing.

For Cholecystectomy and Gynecologic Cases



For Arthroscopic Cases



Individual Laparoscopic Instruments and Attachments

Endoscopic Camera

- Used to view inside the body during a scope case. Attach the camera to the cords and make sure it is working properly before the case starts.



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 29.)

- Endoscopic cords attach to the camera before surgery.

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 29.)



- ⊘ NEVER coil the cords tighter than the diameter of a large soda bottle. The fiber optics in the cord will break if they are coiled too tight.
- ⊘ NEVER place anything on top of the cords or camera. This can damage the camera.

Veress Needle

Used to puncture the peritoneum and introduce CO₂ into the abdomen to create a pneumoperitoneum. The needle is attached to insufflator tubing.

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 30.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 31.)



Trocars

Used to introduce endoscopic instruments into the body cavity during a scope case.

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 31.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 31.)



Laparoscopic Handles

- Used to attach to laparoscopic instruments to manipulate them.
- They have rotating handles with a cautery connection or a ratchet.

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 31.)



Curved Grasper

Used to dissect or grasp a tissue and/or an organ; it has serrated jaws.

(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 33.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 33.)



Maryland Dissector

Used to grasp tissue and dissect fine tissue; has fully serrated blades.



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 33.)



(From Rutherford, Differentiating Surgical Instruments, 2e, Philadelphia, PA, F. A. Davis Co., 2012, p. 33.)

Tips for Staying Sharp during Laparoscopies

- *Always read the preference cards before the case.* This will help you know what may be used for the case.
- Understand how your laparoscopic instruments go together.
- Check all instruments to ensure they are in good working condition. A nonfunctioning instrument will upset a surgeon.
- Do not hesitate to mark an instrument as needing repair or replacement by Central Processing.
- It is important to learn how to handle the scope instruments. They are longer and you can contaminate them more easily than during an open case.
- Have the major set opened and counted if you think the case will go open. Have equipment and sutures in the room ready.
- Different sets are used in different facilities. Familiarize yourself with what your facility has.
- Familiarize yourself with the scopes; understand the different degrees for viewing and *pay attention*.
- Scope sizes come in a variety of sizes; in addition, trocars/sheaths come sharp and blunt. Know what the surgeon will want and need for the procedure.
- If your college or facility has a simulator for laparoscopies, use it to practice daily.
- Keep the surgeon's working area in the center of the screen if you are operating the camera/scope. Follow the surgeon accordingly as he or she moves.
- Remember when using the camera: *right is left and left is right*.
- Know *your* tower and how each area works. Be familiar with all of its electronics.
- You may need to troubleshoot the tower in an emergency situation.



Bird's Eye View

A typical open case set-up shows where your Mayo and back table would be located. The surgeon is on the left and the scrub person is on right.

Suture

- Suture is material used to ligate, or tie, tissue together to provide hemostasis.
- The certified surgical technologist (CST) and RN must make themselves familiar with the types of sutures used, the anatomic structures they apply to, and how they work.
- Each OR room will have a variety of sutures in the room; however, something can go wrong. If so, the circulator may need to run for different sutures if they are not in the room.

Do not leave the room when serving as a sterile STSR. Your responsibility is to be prepared so the circulator does not need to leave the room to obtain supplies.

- The surgeon's preference card will tell you what sutures the surgeon plans to use for each procedure. It is essential that you read it before setting up the case.
- Surgeons are notorious for changing what is on the preference card. Before setting up, ask a seasoned CST or RN if you need extra sutures in the room in case the surgeon changes what he or she wants.

Suture Forms

Suture Ligature or Stick Tie

Suture attached to a needle



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 1137.)

Free Tie

Single strand of material handed to the surgeon to ligate a vessel or structure

**Reel or Ligapak**

Used to tie vessels or tissue

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 112.)



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 112.)



Tie on a Passer

Single strand of suture placed on a mixer, tonsil, or long clamp, depending on surgeon's preference



Types of Sutures

Sutures are categorized by number of filaments, by their absorbability, and by whether natural or synthetic. Within each category, there are several possibilities and overlaps.

Multifilament vs. Monofilament

Multifilament

Multiple strands twisted or braided together to form one strand

Silk

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 113.)



Cotton



Monofilament

A single strand

Example: Prolene

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 114.)



Absorbable Sutures



Absorbable sutures do not act as a foreign body. The sutures break down by reacting with water in tissue fluids or they are digested by enzyme activity and assimilated by the tissues during the healing process.

Types of Absorbable Sutures

- Surgical gut or catgut is made from the submucous layer of a sheep's intestine. It is cleaned, dried, and twisted into threads of various sizes, then prepared for use by special treatment. The length of time for complete absorption of surgical gut in a wound varies according to the action of certain hardening agents used in the process.

- Collagen suture (plain gut) is made from the tendons of cattle or sheep submucosa. It is absorbed quickly. Chromic gut sutures are treated with chromium trioxide. This makes chromic more resistant to absorption than plain gut. Both are absorbed easily.
- Synthetic suture is made from manufactured chemical polymers. They can cause less tissue reaction than organic sutures.

Examples of Absorbable Sutures

Type	Example
Nonsynthetic	<p>Plain gut</p> 
Nonsynthetic	<p>Chromic gut</p> 

Examples of Absorbable Sutures—cont'd

Synthetic

Biosyn



Synthetic

Vicryl



Synthetic

Dexon



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 115.)

Continued

Examples of Absorbable Sutures—cont'd

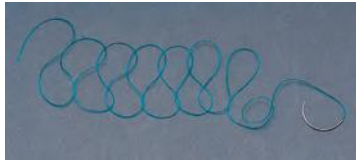
Synthetic

Polysorb



Synthetic

Maxon



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 112.)

Synthetic

PDS



(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 114.)

Examples of Absorbable Sutures—cont'd

Synthetic

Monocryl



Nonabsorbable Sutures

Nonabsorbable sutures act as a foreign body and may require removal. Some nonabsorbable sutures are left in the body.

Types of Nonabsorbable Sutures

Cotton

- Made from cotton fibers; strands are twisted
- Used for both internal & external sutures
- Should always be used wet for maximal strength
- Used to close the cervix in a cerclage procedure

Dacron

- Synthetic polyester fiber
- Greater tensile strength
- Minimal tissue reaction & maximal visibility
- Nonabsorbent & nonfraying
- Used in cardiovascular, ophthalmic, & neurologic cases
- Examples: Ti-Con, Mersilene, Tevdek, Polydek, Ethibond, & Surgidac



Nylon

- Monofilament, multifilament, or braided
- Disadvantage—a triple knot must be tied to secure it
- Used in arteries, bladder, cardiovascular, & neurology



Polypropylene

- Clear or pigmented polymer & a monofilament suture material
- Inert & can be used in the presence of infection
- High tensile strength
- Causes minimal tissue reaction
- Used in cardiovascular, general, & plastic surgery
- Examples: Prolene, Surgilene, Surgipro, & Dermalene



Silk

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 113.)



- Made by the silkworm larva for its cocoon
- Comes twisted or braided & in sizes comparable with surgical gut
- High tensile strength
- Relatively inexpensive
- Less tissue reaction
- Often used for drains

Surgical Steel

- Made of stainless steel
- Can be used for repair of hernias & large defects, sternal closure, bone repair, & as retention sutures

**Staples**

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 110.)



- Many clip styles available for the purpose of holding the edges of tissue in approximation
- Tend to produce some scarring when used in the skin but may be used when wound is infected

Tantalum

- Bluish gray metal; nonirritating to body tissues
- High tensile strength & inert reaction to tissues
- Used in implants

Wire

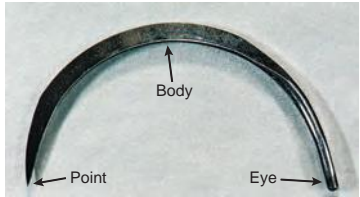
- Maximal flexibility & tensile strength
- Causes little or no local reaction in tissue where it is placed
- Used in orthopedic cases

⚠ Never mix metals in tissue. You must use the same type, and the suture must also be compatible.

Surgical Needles

Most sutures come as a single piece with the suture material swaged (or preattached) onto the base of the needle. The needle should be grasped in the tip of the needle holder about two-thirds of the way back from the point. Grasping any closer to the swaged end tends to weaken the needle and its attachment to the suture. You are likely to bend the needle if it is grasped incorrectly.

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 118.)



Classification of Needles

General Classification

Traumatic needles: These tear the tissue as they pass through.

Atraumatic needles: The suture end of a swaged needle is smaller than the needle body, causing less tissue damage.

Needle Types

There are many different needle types; the chief distinction is between tapered needles and cutting needles.

Tapered Needles

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 120.)



These needles gradually taper to the point. A cross-section anywhere along the shaft would reveal a round shaft. They are used for tissue that is easy to penetrate: aponeurosis, muscles, nerves, peritoneum, blood vessels, and valves.

⚠️ **Never use tapered needles to suture skin. Penetrating skin with a tapered needle is difficult and causes trauma to the skin because of the force required for penetration and the need to grasp the skin edge very tightly with forceps.**

Cutting Needles

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 119.)



The tip of a cutting needle is triangular, and the apex forms a cutting surface. The cutting edge is up, which facilitates penetration of tough tissue, such as skin.

Reverse Cutting Needles

This needle is similar to a conventional cutting needle, except the cutting edge faces down instead of up, which can decrease the likelihood of sutures pulling through tissue.

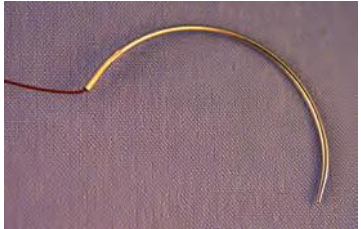
(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 119.)



Blunt Needles

Blunt needles have a blunt point and flat body. They are used in bowel, kidney, spleen, and liver procedures.

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 120.)



Triangular Needles

Triangular needles have a triangular point and flat or quadrangular body. If the cutting side of a triangular is upward, it is called conventional (skin, sternum), and if it's downward, it's called reverse cutting (fascia, ligaments, skin, tendons).

Remember: For skin sutures it is important to leave 4–5 mm “ears” to help with suture removal. However, do so only if the suturing technique is not a subcuticular closure.

Scissors

Mayo Scissors

These scissors are made for tough jobs like cutting sutures. Mayos are heavier than Metzenbaum scissors.



Metzenbaum Scissors ("Metz")

Metz are thinner, sleeker, and lighter than Mayos and are made for dissecting tissue. Avoid using Metzenbaum scissors to cut sutures. The suture damages the scissor.



Instrument Handling

Scissors


- Scissors are generally held with the thumb slightly in one ring and the ring finger in the other. The index finger stabilizes the instrument by resting on the shaft of the scissors, although this is a matter of preference.
- When cutting sutures, many recommend sliding the tips of the scissors down at an angle along the strands to the point where they will be cut.



Forceps

- The forceps should be held so one arm is an extension of your thumb and the other is an extension of your index finger. The bottom or end of the forceps should rest on the web space between the thumb and index finger.



- Use only forceps with teeth. Use the forceps with a single tooth to *gently* elevate the skin edge.
 - For skin closure, you can use a fine-toothed forceps, such as an Adson with teeth.
 - The forceps allows you to create counter-traction and control the position of the skin edge to facilitate passage of the needle perpendicularly through the skin.
 - Do not crush the skin edges with the forceps. This further harms the wound edge and delays healing.
 - The forceps should be used to grip the needle when repositioning it in the needle holder.
-  **NEVER touch the needle with your fingers. Always use a needle holder.**

Wounds

Wounds are any tissue that has been disrupted by surgical incision (intentionally) or trauma (accidentally).

- Documentation of the surgical wound classification at the end of the case is crucial.
- The classification of the wound reflects the probability of infection and enables the collection of data for the hospital's surgical site infection (SSI) rate, which is recorded and monitored by the Risk Management Department (RMD). The RMD can start appropriate prevention measures when needed. Preventing infections is a priority and an important part of everyone's job.
- Documenting the wound classification at the end of the case is crucial. The RN in charge of the room documents the wound classification information.

Classification of Surgical Wounds

	Class	Description	Details
Heals slower <----- Heals faster	I	Clean uninfected	No break in sterile technique; no entry into gastrointestinal tract or genitourinary tract; asepsis was incorporated throughout
	II	Clean contaminated	Minor break in aseptic technique, and/or controlled entry into gastrointestinal tract with no spillage of content
	III	Contaminated	Open fresh traumatic wound; major break in aseptic technique during procedure; infected wound; or gross spillage from gastrointestinal tract
	IV	Dirty	Operative wound dirty; open traumatic wound; traumatic wound with delayed treatment; infected prior to surgery; perforated viscous

Types of Wound Healing

FIRST INTENTION (lag phase)	No post-op swelling, infection. No dead space (occurs when tissue was not properly approximated under skin, creating space for infection). No complications.	Healing by primary union. The incision heals together tissue to tissue. Quickest to heal.
SECOND INTENTION (proliferation phase)	Heals by granulation from the inside outward. Example: debridement.	Longer to heal than first intention. Increased scar, weaker formation, & easily herniated at incision site (hernia).
THIRD INTENTION (maturation phase)	Like secondary intention but wound is left open at time of surgery to heal, initially by granulation, before suturing. Usually a grossly contaminated wound.	Longer healing; must wait for inflammation to decrease. Scar formation occurs. Tensile strength is increased as collagen reforms in cross-like links.

Prepping the Patient

- The purpose of prepping is to prevent bacteria on the skin from entering the surgical wound. The prepping decreases the possibility of a surgical site infection (SSI).
- The skin prep is a sterile procedure.
- You will prep according to the surgeon's preference, the facility's policy and procedures, and the body region undergoing the procedure.
- The certified surgical technologist (CST) can act as the second circulator (STCR); alternatively, the RN serving as the circulator can prep.
- All of the following must be performed prior to the surgical prep:
 - Anesthesia administration
 - Foley catheterization (if required)
 - Positioning
 - Exposure of the surgical site
 - Hair removal (if required)
 - Skin marking by surgeon or resident

Always check your institution's policy and procedures for prepping and abide by these guidelines.

Common Types of Skin Preps

Alcohol

- A 70% isopropyl alcohol solution is most often used for skin preps.
- It is colorless; however, many hospitals add a color (blue) so it will not be confused with other colorless solutions like saline or water.
- It kills bacteria by drying out the cell protein.
- Do not use in the eye, in open wounds, or on mucous membranes. It is too drying for these areas.

Iodophors (Betadine)

- Iodine and povidone are combined to create iodophors.
- The most commonly used is a 10% Betadine solution, which is called "paint."
- Iodophor mixed with a detergent makes the liquid a 7.5% solution, which is called the "scrub solution."
- The scrub solution is used as a skin prep or a surgical hand scrub.

- It is applied first then rinsed (not left on the skin), and the paint is applied afterward.
- Do not use scrub solution in or around the eyes or mucous membranes. Paint can be used in these areas, depending on the surgeon's preference.
- ⚠ Do not use iodophors on patients who are allergic to shellfish or iodine.

Chlorhexidine (Hibiclens)

- Hibiclens® is an alcohol-based solution.
- It has a broad-spectrum antimicrobial effect that lasts residually for up to 5 hours.
- The recommended use for prepping is to sterilely cleanse the skin for 2 minutes, dry the area, reapply for 2 minutes, then dry a second time.
- Again, do not drape the area when still wet because of the fire hazard.
- Do not use in or around the eye, in the mouth, or in open wounds.
- ⚠ Do not use chlorhexidine in or around the ear. It has been associated with hearing loss.

DuraPrep™

- DuraPrep is a combination of 70% isopropyl and iodophor solution that kills bacteria for up to 12 hours.
- It is a one-step prep solution, so it is quicker to work with (and consequently becoming more popular).
- Because of the antimicrobial film that forms when it is applied, DuraPrep cannot be removed easily postoperatively. You will need to use DuraPrep remover.

SKIN PREP CAUTIONS

- Alcohol and DuraPrep are highly flammable. The prepped area must be dry before draping occurs. If the surgical team drapes before the area is dry and uses electrocautery or a laser, the solutions can ignite and cause a fire. Betadine is also flammable.
- ⚠ Do not allow any prep solution to pool under the patient. Pooled solution can cause chemical burns and increase the risk of electrosurgical or laser burns.

- Check the patient's allergies. Many people are allergic to some prep solutions, so you may need to use an alternative antiseptic.

Shaving

- Shaving is no longer routinely done.
- If you need to shave the patient, it is recommended that you use a clipper, not a razor, to remove hair.
- Remove the hair as close to the surgical time as possible.
- The amount of time between the surgical shave and the operation has a direct effect on the SSI rate: the longer the time between the surgical shave and the incision, the higher the rate of SSI.

Regional Prepping

- Open gloving is used for prepping, catheterization, and dressing changes.
- Open gloving is different from closed gloving. You do not need to wear a sterile gown, and you do not need to do a 3–5 minute scrub or use foam before you glove.
- You must have the catheterization kit or prepping kit open and ready to use prior to gloving. Your patient must be undressed, uncovered, and ready for the procedure.



You can sterily open glove using a number of different methods. The next section explains one common technique.

Steps in Open Gloving

Open gloving is a sterile procedure.

- Take the sterile gloves you selected and open them sterily.



- While your hands are bare
 - Do not touch the sterile inner area of the glove wrapper.
 - Touch only the 1-inch folded edge around the outside of the glove wrapper.



- Sterile gloves are cuffed (the unsterile inside partially turned out). You can pick up the cuffed area of either the right- or left-hand glove first according to your own preference.



- Don the gloves one at a time.
- Don the first glove with your naked opposite hand by grasping the bottom of the cuff and pulling it onto your hand.
- Wiggle the fingers of your free hand into the sterile glove and stretch the cuff out and away from your hand.
- Remember to not contaminate your sterile glove. The principle is *sterile to sterile and nonsterile to nonsterile*.
- You now have one sterile glove on. To pick up the second glove, take your sterilely gloved hand and, touching only the sterile part of the matching glove, slip your sterilely gloved fingers under the cuff of the sterile glove.
- Slip your nonsterile hand (ungloved) into the inside of the glove cuff. Wiggle your fingers into the glove and pull it on with your other sterile, gloved hand.



- Do not touch any nonsterile area of your arm with your sterile gloves.

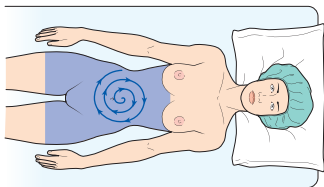


- You have now sterilely open gloved. Your sterile gloved hands stay in front of you. Keep them above your waist and below your chest area.
- You cannot touch anything once you have donned your sterile glove. Do not touch your scrubs. Do not touch anything that is not sterile.



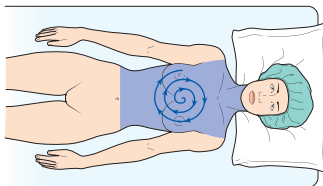
Prepping the Abdomen

Start at the umbilicus. Use two cotton-tipped applicators to clean out the umbilicus. After disposing of them sterilely, start cleaning from the umbilicus in a circular motion moving toward the periphery. The boundary for an abdominal prep is nipple line to midthigh and laterally to the operating table on each side.



Prepping the Chest

Prepping the chest area depends on what procedure is planned. Thoracic or radical breast procedures require a prep of the entire thorax. The boundaries are from the chin to the umbilicus and laterally to the bed line on each side. Start the prep at the future incision line. Use a circular motion and move to the periphery. The prep may be extended to the axilla if the incision will be in the upper lateral area of the breast.



Gynecological Prepping

Start at the pubis with a lateral-medial-lateral motion. Then start at the top of the labia majora on one side and move downward to include the perineum and anus. Once you have cleaned the anus, drop the sponge and do not touch anything already prepped.



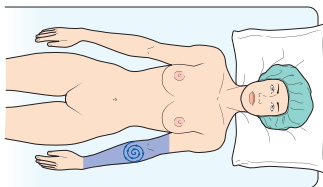
Move to the inner thigh using

a clean sponge. Move laterally from the labia major to the knee, and then discard the sponge. Do the other side in the same manner.

Lastly, prep the vaginal vault, using a sponge on a stick, with a gentle circular motion. Do this twice. Use a dry sponge to blot excess prep dry.

Prepping the Upper Extremity

The arm is prepped entirely in a circumferential manner, depending on where the incision will be made. The arm is held by a second person to allow the prep person to start at the incision site and move to the periphery. If the incision will be in the lower arm, the prep extends from above the elbow to the wrist area. If the hand is included in the prep, start at the fingernails and then prep the hand, then continue in the previous manner to prep the arm. Do not allow any prep solution to get under a pneumatic tourniquet.

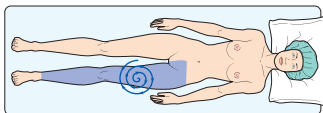


Circumferentially

Prepping the Lower Extremity

The leg is prepped like the arm, including the use of a second person to hold up the extremity for access. The prep goes from the ankle to the groin. If the foot is included in the prep, do the foot like the hand. Start with the toenails, then the foot, and then circumferentially prep the leg.

If hip surgery is planned, prep from the midcalf circumferential to the iliac crest. The groin is usually not included, but, as always, check your institution's guidelines to be sure. Do not allow any pooling of prep under any type of tourniquet.



Catheterization

Depending on the procedure, the patient may need to be catheterized. This may be performed after the prep is finished if you are doing a GYN prep, or it could be a stand-alone catheterization for an extended procedure. This procedure is done only after anesthesia personnel say it is safe to do so. When doing a catheterization, one hand is kept sterile and the other is nonsterile.

Equipment Prep

Open the supplies sterilely and don sterile gloves using the open gloving technique. Arrange your supplies, and then check the catheter balloon for any leakage by inserting 5 cc of sterile water from the syringe provided in the supplies into the balloon. Then withdraw the fluid from the catheter balloon but leave the syringe attached to the catheter. Set the catheter aside and keep it sterile.

Female Catheterization

- If the patient is not in a lithotomy position, place the legs in the frog leg position.
- Using your nondominant hand, separate the labia. Prep will continue while you keep the nondominant hand in this position.
- Using your sterile hand, cleanse one side of the labia major and minora, then the other side. Clean the middle area, starting at the clitoris down the meatus and across the vagina in a downward motion.
- Drop the sponge.
- Keep the labia separated to maintain a clean area for the insertion of the catheter.
- Keeping your hand sterile, grasp the catheter and insert it into the urethra. Do not touch the catheter to anything that will contaminate it.
- If you do contaminate the catheter, you must ask the circulator to get you a new one.
- Insert the catheter until you see urine in the clear tubing, then insert it a touch more to make sure it is in the bladder.
- Inflate the balloon with the attached syringe of sterile water.
- Gently tug on the catheter to make sure it will stay in. Do not apply any tension on the catheter once it is placed.
- Place the drainage unit toward the anesthesia provider so he or she can keep track of the urine output.
- Follow your facility's guidelines on securing the tube to the patient.

Male Catheterization

- The patient will be in the supine position.
- Using your nondominant hand, hold the penis upright. Prep will continue while you keep the nondominant hand in this position.

- Using your sterile hand and starting at the meatus, clean the penis using a circular motion and moving circumferentially.
- Drop the sponge when you reach the base of the penis.
- Clean the penis a second time.
- Keeping your hand sterile, grasp the catheter and insert it into the urethra. Do not touch the catheter to anything that will contaminate it.
- If you do contaminate the catheter, you must ask the circulator to get you a new one.
- Insert the catheter until you see urine in the clear tubing, then insert it a touch more to make sure it is in the bladder.
- Inflate the balloon with the attached syringe of sterile water.
- Gently tug on the catheter to make sure it will stay in. Do not apply any tension on the catheter once it is placed.
- Place the drainage unit toward the anesthesia provider so he or she can keep track of the urine output.
- Follow your facility's guidelines on securing the tube to the patient.
- Note: A male's urethra is much longer than a female's, so you need to make sure the balloon is in the bladder before inflating it. Thus, on a male patient, do not inflate the balloon if you do not see any urine in the tubing. Insert up to the Y of the tubing, and if you do not see any urine call the surgeon and ask how you should proceed.

For uncircumcised males, make sure the foreskin is pulled back over the meatus after you complete the catheterization.

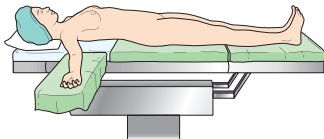
Positioning

Positioning is an important factor in any procedure. You must know the correct way to position a patient for each procedure that provides the best access and visualization of the surgical site and maintains the patient's safety.

- If improperly positioned, a patient can suffer injury to the musculoskeletal systems, skin, and nerves.
- The surgeon and the anesthesia provider determine the position.
- The patient's physiological condition, weight, height, age, and pre-existing diseases affect the choice of the position.

Supine

- The patient is flat on the back.
- Used for abdominal, breast, thyroid, knee, or facial procedures.



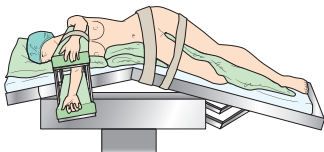
Prone

- The patient is lying on the stomach with appropriate positioning devices and padding underneath.
- Used for back, buttock, or anal procedures.



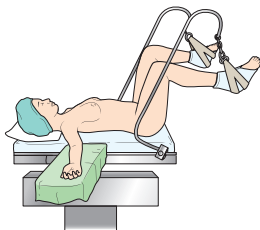
Lateral

- The patient is lying on the right or left side.
- The leg on the bottom is bent at the knee and the top leg is straight, with a pillow between the legs along with a support by the foot.
- Position the arms according to the surgeon's preference.
- Used for kidney, thoracic, or hip procedures.



Lithotomy

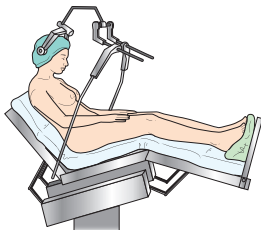
- The patient's legs are up in stirrups.
- Pay close attention to the positioning so as not to injure the popliteal artery or cause nerve damage. This can result in the patient having problems walking.
- The legs must be padded so they will not touch any metal on the stirrup or candy cane.
- Place the patient's legs in the stirrups, then take them out simultaneously to avoid injuring the hip or knee joints.



- If the patient has had a total hip replacement, place the legs in the stirrups while the patient is awake so he or she can help you guide the legs to avoid injury.
- Used for any vaginal or rectal procedures.

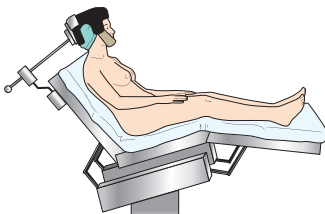
Beach Chair

- The patient is in a sitting position.
- A pillow is usually under the calves.
- The patient's arms are positioned as the surgeon prefers.
- Used for shoulder or craniotomy procedures.



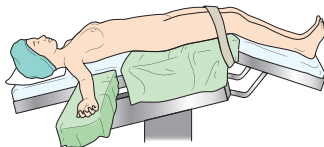
Fowler's

- This is a modified sitting position.
- The patient is not sitting up as far as in the beach chair position.
- Used for shoulder or craniotomy procedures.



Trendelenburg

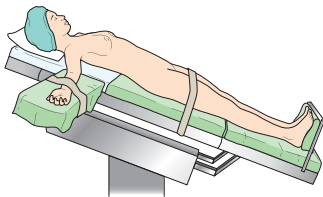
- The patient is positioned with the head down and feet up.
- Shoulder braces should be in place so the patient does not slide.
- The patient is not placed in this position initially but is usually moved during the surgical procedure.



- This position is for laparoscopy procedures when the surgeon needs to move the visceral away from the lower abdominal cavity by gravity. For example, placing the hysterectomy patient in this position would allow gravity to move the intestines up and away from the uterus for better visualization.

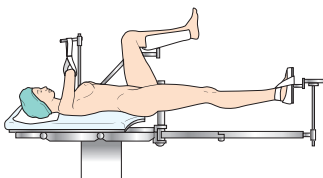
Reverse Trendelenburg

- The patient is positioned with the head up and feet down.
- The feet are positioned against a padded footboard so the patient will not slide off the table.
- The patient is not placed in this position initially but is usually moved to this position during the surgical procedure.
- Used for laparoscopic cholecystectomy cases to move the intestine away from the gallbladder area for better visualization.



Fracture Table

- Used for pinning a fractured femur.
- The patient is brought to the OR on a bed and transferred onto the fracture table.
- The unaffected leg is secured in the stirrup and padded well so that no area of the skin is touching the metal of the stirrup. The patient will not be burned inadvertently if electrocautery is used.



Devices to Help with Positioning

Wilson Frame

- Used when the patient is in the prone position.

(From Rutherford, Differentiating Surgical Instruments and Supplies, 1e, Philadelphia, PA, F. A. Davis Co., 2010, p. 22.)



- Padded and in a curved position.
- The patient's chest is positioned on a roll or padding so he or she can breathe more easily on his or her stomach.

Bean Bag

- Used to position a patient in the lateral position.



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- Contains bean-like structures and has a suction attachment. When you attach it to suction, the bag becomes stiff and holds the patient in place securely.
- If bean bags are not available, egg crates may be used.

Gel Pads

- Used to prevent nerve damage in the patient.
- Come in a variety of sizes and shapes.
- Soft, squishy, and cleanable when the surgery is finished.
- Not available at all facilities.

Foam Pads

- Used while the patient is prone.
- Disposable & changed for each patient.
- Not available at all facilities.



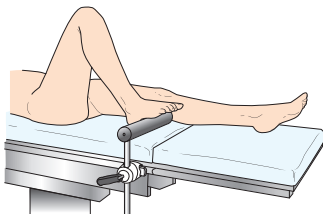
Eye Protectors

- Used to protect the eyes in a variety of surgeries from cleaning solution or debris from the surgery.



Total Knee Stabilizer

- Used during a knee replacement surgery to secure the knee in a bent position so the assistant does not need to hold the knee in position.



Safety Strap

- Used to secure the patient to the narrow OR table during surgery.
- The strap is placed based on the patient's position. For supine or prone positioning, place the strap over the thighs and secure to the OR bed.



Draping

The purpose of surgical draping is to create an aseptic barrier between the sterile and nonsterile area that prevents the transfer of microorganisms. Disposable drapes are generally paper or plastic or a combination and may or may not be absorbent. Nondisposable drapes are usually double-thickness muslin.

Draping Sterilely

Draping can vary from facility to facility and from surgeon to surgeon; however, draping sterilely should not. Surgical drapes must be sterile.

Aseptic technique must be observed at all times in the draping process.

Drapes, plus any equipment and furniture included in the sterile field,

should be placed on the patient sterilely. If you are not participating in the draping, maintain a safe distance from the operating table until the drapes have been applied.

- The sterile CST/RN should place the drape at the surgical site and unfold it without fanning, which may spread microorganisms throughout the OR.
- Handle the drapes as little as possible.
- Never reach across the operating table to drape the opposite side; go around the table.
- Hold the drapes high enough to avoid touching nonsterile areas while keeping in mind your sterile boundaries.
- Hold the drape above the surgical site until it is directly over the needed area, then place it (open fingers and release sheet) onto the area where it is to remain.
- Protect the gloved hands by cuffing the end of the sheet over them. Do not let the gloved hand touch the patient's skin.



- When unfolding a sheet from the operative site toward the foot or head of the table, protect the gloved hand by enclosing it in the turned-back cuff of the sheet.

DRAPING CAUTIONS

- Never adjust any drape; this movement may compromise the sterile field.
- A contaminated or incorrectly placed drape should be removed and discarded; it may be necessary to reprep the area, and then redrape.
- If the end of a drape falls below waist level or table level it is considered contaminated. Do not handle it further. Drop it and use another drape.
- If a hole is found in a drape after it is laid down, discard the entire drape and redrape the patient.
- Sterile gloved hands are not allowed below the waist or below table level at any time during draping.
- If a drape becomes contaminated, discard it immediately.
- If in doubt about sterility, discard the drape.

Draping the Abdomen or Chest

Drapes are applied to the exposed abdomen or chest prepped as the surgical site.

Towel Placement

- The draping of the site begins with towel placement.
- Towel placement, whether for the abdomen or chest, follows a specific protocol.

Disposable Cloth Towels

- Four towels folded one-fourth over and the four towel clips (if needed) are given, one at a time, to the surgeon or surgical assistant by the CST or scrub nurse, depending on the surgeon's preference.
- Towels are placed with the folded edge down. The first three are folded toward the CST and the fourth towel is folded away from the CST.
- The first towel is given to the surgeon, who applies the towel onto the patient's chest or abdomen area nearest him or her.
- The second and third towels are given to the surgeon to be placed superiorly and then inferiorly on the chest or abdomen area.



- The fourth towel is placed opposite the first towel across the chest or abdomen on the side toward the CST by the surgeon.
- The final placement creates a squared area on the prepped chest or abdomen.



- Nonperforated towel clamps are applied to the corners of the towels closest to the prepped chest. This secures the towels in place. Some surgeons prefer perforated towel clamps because the perforation clamp into the patient's skin prevents anyone from moving them after they are placed. Perforated towel clamps are removed when the procedure is completed. Once they perforate the skin they are not sterile and must be left in place.



Disposable Noncloth Towels

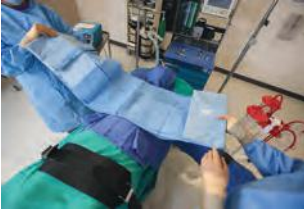
- The same cloth towel procedure is followed for noncloth towels.
- The paper towels are prefolded with sticky tape.
- The towels are given in the same order and way.
- The scrub removes the white covering over the sticky area so the surgeon can apply the towel without the need for towel clamps.
- The towels stick to the abdomen and do not move once applied.

Laparoscopy and Laparotomy Draping

The next step after the towels are applied is the laparoscopy (scope procedure) or laparotomy (open procedure) drape.

- Grasp the drape and pass in the folded position, holding it taut.
- Place the fenestration or opening of the drape directly over the prepped abdomen outlined by the towels, in the direction indicated for the foot and head of the operating bed.
- Remove the protective covering from the self-adherent drape.
- Stick the drape on to the abdomen by pressing down the self-adherent area.
- Hold the drape at table level. Do not allow it to drop below this level.
- Proceed to unfold the drape by opening first toward the feet and then toward the head where anesthesia is located.
- Keep in mind the armrest area must be covered entirely. Do not touch the end of the armrest area because it is out of the sterile area for scrub personnel. The circulator can adjust the armrest if needed.
- The surgeon and CST must keep their gloved hands sterile by cuffing their hands under the drape before handing off the drape to the anesthesia person at the periphery of the sterile field.





(From Bidwell & Graft, Surgical Procedures. Philadelphia, PA, F. A. Davis Co., 2014.)

(From Bidwell & Graft, Surgical Procedures. Philadelphia, PA, F. A. Davis Co., 2014.)

- Anesthesia then secures the drape to the screen or IV poles to provide a barrier from sterile to nonsterile.
- Staying sterile, continue stabilizing the drape on the patient.
- At this point, a sterile impermeable adhesive drape may be applied, depending on the surgeon's preference.
 - For maximum sealing to prevent wound contamination, the prepped skin must be *dry*, and the applied plastic drape must not have any wrinkles and air bubbles. The surgeon and CST will hold the plastic drape taut while the CST peels the back off.
 - The surgeon applies the plastic drape to the operative site and, using folded towels, applies a slight pressure to eliminate any air bubbles and wrinkles. The surgeon will make the incision through the plastic drape.
- Sterile gowns and gloves must not contact nonsterile personnel or items during the draping procedure.
- Drapes are *not* relocated after initial placement. Hand Mayo scissors to the surgeon if he or she needs to cut a wider opening.

The OR Is a Unique Environment

- Your actions impact real people; mistakes can cost a life, or result in a severe infection or injury. **You do not get a second chance in surgery.**
- You are responsible for the patients and their care. They trust you, as well as everyone in the OR, to put their needs first in this unique environment.
- Surgical conscience is the foundation of your job in surgery. You must understand sterile technique and the principles of aseptic technique, as well as follow them.
- Every OR has its own type of personality (their way of doing things). When you move to a new facility you must learn their policies and procedures so you can adjust to their ways. Many options are available to do things sterily; this book provides recommendations for scrubbing, gowning, gloving, and so on.
- Make sure you are well trained in the skills of scrubbing.
- You must be flexible but stay within the recommended guidelines.
- Students and new personnel may encounter an extremely assertive environment in the OR.
- There are many no-nonsense people on OR teams. These people are blunt and tell you exactly what you are doing incorrectly.
- You must understand that when you make minor mistakes, even if you are a student, you will be held accountable for them.
- The team needs to correct you immediately when you make an error; for instance, when you break sterile technique or need a different suture for the surgeon.
- Constructive criticism is a necessary part of the learning process in the surgical arena.
- Respond in a mature fashion to these situations.
- The pressure of the situation often causes OR personnel to be brusque, snippy, and demanding.
- You must have a strong constitution and not take what is said personally. The OR team cannot take time to coddle workers who take things personally.
- Having a sense of humor will also help you in the high stress area of surgery. Humor is a great way to reduce stress in tough situations. Learn from your mistakes and be able to laugh at yourself.

You will succeed in the OR if you have strong self-confidence and a positive attitude.

Communicate

Communication is very important in the OR.

- The tone and inflection of your words are the keys to a well-run OR. You need a calm and even tone to work with your team. Yelling will have a negative effect. If you are constantly agitated or overly excited you can create a negative atmosphere. You and the team may make more mistakes when you are this way.
- Keep your voice steady and loud enough for the circulator to hear you when you need sterile supplies or need to count.
- In surgery, eyes are used to convey needs.
- Use your eyes when time is essential to what you require for the case.
 - Looking at your circulator, then looking at the lap sponge on your Mayo, can signal to him or her that you need more sponges.
 - A glare at people talking too loudly during a case can quiet them.
 - Rolling your eyes at one of the staff could either convey mutual suffering or impatience.
- Asking questions before the surgery begins will keep the procedure running smoothly.
- Remember these five C's of communication:
 - A. Clarity—Make your instructions clear and understandable.
 - B. Completeness—Give all the information needed.
 - C. Conciseness—Provide the information, or answer a question, in as few words as possible.
 - D. Cohesiveness—Speak in a way that encourages teamwork.
 - E. Courteous—be polite, not verbally aggressive and mean.

Lack of communication can lead to errors in the surgical area, and that can affect your patient in a negative way.

Be Prepared

- Being unprepared for a case will cause tension during the procedure.
- Be a self-starter. Surgery is a place where you must have initiative.
- Keep focused on the case. Do not get caught up in other conversations during the procedure.
- You must be able to think and act on your own.
- Have confidence that you know more than you think.

- If you are unsure about something, refer to this book or ask someone you can trust.
- Think outside the box. For example, if you are on call and need an instrument that is not available, think of one that could fit the occasion.
- Use what you have until the needed instruments or supplies are given to you.
- Ask for suture, sponges, and so on, *before these supplies run out.*

ANTICIPATE

- *The ability to anticipate the surgeon's needs is the key to your survival in the OR.*
- Surgeons highly value people who are skilled in knowing what instruments and sutures the surgeon wants and when during his or her procedures. The skill comes from your training, close observation, and experience.
- You may find it helpful to review a procedure in advance by using a textbook.
- The preference cards the surgeon fills out for each procedure are beneficial for a student or new scrubs. The cards have specific information on them concerning the surgeon's specific requirements for instruments, equipment, supplies, and draping.
- Keeping the surgeon from waiting will make for a positive work environment. Pay attention!
- Working frequently with the same surgeon will also help you know what the surgeon will need. Surgeons like to have the same people working with them over time, as a trust forms between the team and the surgeon.

Conflicts in the OR

- The people in the OR, like in any workplace, can create an unpleasant or even hostile workplace at times. The pressure of the surgical procedure can lead to surly behavior in the OR setting.
- Most people are great to work with, but some can be trying.
- Try to deal with difficult coworkers or surgeons with good communication skills and attitudes.
- Always keep your patient's needs first.

The OR is a tight group of people who work together behind closed doors for long periods of time.

- Alliances are made.
- Some people will cover for themselves or for someone else.
- Surgeons, perioperative nurses, and CSTs will behave inappropriately on occasion.
- You must be flexible.
- You must be able to cope and function in this type of atmosphere.
- Choose your battles carefully. Some are not worth it.
- Some behavior, however, should be reported:
 - Constantly yelling
 - Bullying
 - Cursing
 - Name calling
 - Throwing things
 - Telling you to figure it out yourself after you ask a question
 - Having a consistently negative attitude
- Do not leave your patient even if the room becomes difficult. This can be considered abandonment (and grounds for a malpractice claim).
- If an issue needs to be addressed, do so after the case is completed.
 - Start with your supervisor.
 - Document all events ASAP.
 - Keep a copy for yourself—not at the hospital but at home.
- If you do *not* want to pursue the issue:
 - Do not talk about the behavior with everyone; talking or complaining only makes the situation worse.
 - *Confidentiality* is of the utmost importance for you and the situation.
 - The more talk there is about the issue, the more it gets blown out of proportion.
 - In the OR arena, it is absolutely necessary to have confidence in your skills and be strong in the face of a difficult situation.

Bullying

- Bullying is called many things: lateral violence, hostile environment, mobbing, psychological terror, and more. The meaning is all the same: the creation of an environment of intimidation, fear, and hostility in the workplace.

- According to the article “Workplace Bullying” by Esque I. Walker, CST, PhD, “Bullying is a phenomenon that targets high-performing, ethical employees and is based on the bully’s need to control and obtain his or her own personal goals.”
- Acts of bullying can be
 - Moving instruments to different places, thereby forcing the student or new hire to hunt for the items. The bully is then able to triumphantly “save the day” by finding the item for the surgeon.
 - Hiding count items so that the student or new hire is required to recount until the item or items are found.
- Bullies deny doing anything, so it’s their word against the victim’s.
- You may think this never happens but it does. You can find many journal articles on this topic.
- Bullying often goes ignored by those in charge.
- If you are the recipient of, or witness to, bullying, you must report it.
- If unreported, the bullying will only become worse; the quicker it is dealt with, the better for all employees.

Sexual Harassment

- Sexual harassment comes in different forms. It can be sexual innuendos, direct physical harassment, or indirect sexual harassment.
- Inappropriate sexual behavior should not be tolerated.
- Sexual innuendos may need to be dealt with in the OR. If you are uncomfortable with them, then go to your superior and report it.
- You need to be careful and not participate in harassing behavior.
- If the behavior continues, report it. Go up the chain of command if needed.
- You do not have to put up with sexual harassment.
- Sexual harassment is a difficult agenda to follow through on, and many will not report this type of behavior for fear of retaliation.

Cursing

- Some personnel ignore inappropriate language, and some do not.
- Excessive foul language is not professional.
- Patients can hear while asleep, so be cautious what you say.
- Report a surgeon who cannot stop cursing during a case.

Keep Cool

Surgery is a high-stress arena. People deal with it in many ways.

- The OR is usually a pleasant place to work, but occasionally it is not.
- The OR will become intense at times, as situations will occur that can be very stressful for you.

Always stay calm no matter how intense it gets during the case.

- Strategies for dealing with stress and staying calm include the following:
 - Be prepared for your case.
 - Anticipate what will be needed.
 - Keep a positive attitude toward the procedure and your team.
 - Practice deep breathing if things get difficult during the case; this will help calm you.
 - Be prepared for the unexpected; for example, if a laparoscopic case goes open, or the case you prepared for changes into another case (e.g., a breast biopsy turns into an emergency appendectomy). Stay calm and figure out what you will need.

Twelve Ways to Fail in the OR

1. Be territorial.
2. Set your coworker up to fail.
3. Allow your coworker to take the blame for your mistake.
4. Be hypercritical.
5. Gossip.
6. Be condescending.
7. Curse and/or have a sudden burst of anger at your team.
8. Refuse to admit your own mistakes.
9. Make it clear that your opinion is the only correct opinion.
10. Be unprepared for the procedure.
11. Be unsafe with sharps.
12. Have a negative attitude

Notes

Surgeries

Name of surgery_____

Definition_____

Procedure_____

Patient preparation_____

Draping_____

Equipment_____

Instruments_____

Supplies_____

Special_____

Name of surgery_____

Definition_____

Procedure_____

Patient preparation_____

Draping_____

Equipment_____

Instruments_____

Supplies_____

Special_____

Name of surgery_____

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Special_____

Name of surgery_____

Definition_____

Procedure_____

Patient preparation_____

Draping_____

Equipment_____

Instruments_____

Supplies_____

Special_____

Preference Card		
SURGEON	PROCEDURE	EQUIPMENT
GLOVES	SUTURES	MEDS
INSTRUMENTS	PT PREP	PICK ITEMS
DRSGS	EXTRA ITEMS	

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